

SEQUENCE LISTING

<110> Reed, John C.  
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Fiorentino, Loredana  
Ariza, Maria Eugenia  
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<120> PAAD Domain-Containing Polypeptides,  
Encoding Nucleic Acids, and Methods of Use

<130> P-LJ 4816

<150> US 09/671,760

<151> 2000-09-26

<160> 64

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 76

<212> PRT

<213> Homo sapien

<400> 1

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Leu | Leu | Glu | Gln | Leu | Ser | Gln | Asp | Glu | Leu | Ser | Lys | Phe | Lys | Tyr | Leu |
| 1   |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |     |
| Ile | Thr | Thr | Phe | Ser | Leu | Ala | His | Glu | Leu | Gln | Lys | Ile | Pro | His | Lys |
|     |     | 20  |     |     |     |     | 25  |     |     |     | 30  |     |     |     |     |
| Glu | Val | Asp | Lys | Ala | Asp | Gly | Lys | Gln | Leu | Val | Glu | Ile | Leu | Thr | Thr |
|     | 35  |     |     |     |     | 40  |     |     |     | 45  |     |     |     |     |     |
| His | Cys | Asp | Ser | Tyr | Trp | Val | Glu | Met | Ala | Ser | Leu | Gln | Val | Phe | Glu |
|     | 50  |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |     |
| Lys | Met | His | Arg | Met | Asp | Leu | Ser | Glu | Arg | Ala | Lys |     |     |     |     |
| 65  |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     |     |     |

<210> 2

<211> 76

<212> PRT

<213> Homo sapien

<400> 2

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Tyr | Leu | Glu | Glu | Leu | Lys | Lys | Glu | Glu | Phe | Arg | Lys | Phe | Lys | Glu | His |
| 1   |     |     | 5   |     |     |     | 10  |     |     |     |     | 15  |     |     |     |
| Leu | Lys | Gln | Met | Thr | Leu | Gln | Leu | Glu | Lys | Gln | Ile | Pro | Trp | Thr |     |
|     |     | 20  |     |     |     | 25  |     |     |     | 30  |     |     |     |     |     |
| Glu | Val | Lys | Lys | Ala | Ser | Arg | Glu | Glu | Leu | Ala | Asn | Leu | Leu | Ile | Lys |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | 35  |     |     |     |     | 40  |     |     |     | 45  |     |     |     |     |     |
| His | Tyr | Glu | Glu | Gln | Gln | Ala | Trp | Asn | Ile | Thr | Leu | Arg | Ile | Phe | Gln |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Lys | Met | Asp | Arg | Lys | Asp | Leu | Cys | Met | Lys | Val | Met |     |     |     |     |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     |     |

<210> 3  
 <211> 73  
 <212> PRT  
 <213> Homo sapien

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Ala | Leu | Glu | Glu | Leu | Ser | Gln | Glu | Gln | Leu | Lys | Arg | Phe | Arg | His | Lys |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Leu | Arg | Asp | Val | Gly | Pro | Asp | Gly | Arg | Ser | Ile | Pro | Trp | Gly | Arg | Leu |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Glu | Arg | Ala | Asp | Ala | Val | Asp | Leu | Ala | Glu | Gln | Leu | Ala | Gln | Phe | Tyr |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Gly | Pro | Glu | Pro | Ala | Leu | Glu | Val | Ala | Arg | Lys | Thr | Leu | Lys | Arg | Ala |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Asp | Ala | Arg | Asp | Val | Ala | Ala | Gln | Leu |     |     |     |     |     |     |     |
| 65  |     |     |     |     | 70  |     |     |     |     |     |     |     |     |     |     |

<210> 4  
 <211> 75  
 <212> PRT  
 <213> Homo sapien

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Tyr | Met | Arg | Asn | Val | Ser | His | Glu | Glu | Leu | Gln | Arg | Phe | Lys | Gln | Leu |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Leu | Leu | Thr | Glu | Leu | Ser | Thr | Gly | Thr | Met | Pro | Ile | Thr | Trp | Asp | Gln |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Val | Glu | Thr | Ala | Ser | Trp | Ala | Glu | Val | Val | His | Leu | Leu | Ile | Glu | Arg |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Phe | Pro | Gly | Arg | Arg | Ala | Trp | Asp | Val | Thr | Ser | Asn | Ile | Phe | Ala | Ile |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Met | Asn | Cys | Asp | Lys | Met | Cys | Val | Val | Val | Arg |     |     |     |     |     |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     |     |

<210> 5  
 <211> 76  
 <212> PRT  
 <213> Homo sapien

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Ala | Leu | Ser | Asp | Leu | Glu | Glu | Asn | Asp | Phe | Lys | Lys | Leu | Lys | Phe | Tyr |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Leu | Arg | Asp | Met | Thr | Leu | Ser | Glu | Gly | Gln | Pro | Pro | Leu | Ala | Arg | Gly |
|     |     |     | 20  |     |     |     |     |     | 25  |     |     |     | 30  |     |     |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Glu | Leu | Glu | Gly | Leu | Ile | Pro | Val | Asp | Leu | Ala | Glu | Leu | Leu | Ile | Ser |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Lys | Tyr | Gly | Glu | Lys | Glu | Ala | Val | Lys | Val | Val | Leu | Lys | Gly | Leu | Lys |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Val | Met | Asn | Leu | Leu | Glu | Leu | Val | Asp | Gln | Leu | Ser |     |     |     |     |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     |     |

<210> 6  
 <211> 75  
 <212> PRT  
 <213> Homo sapien

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Tyr | Leu | Glu | Glu | Leu | Glu | Ala | Val | Glu | Leu | Lys | Lys | Phe | Lys | Leu | Tyr |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Leu | Gly | Thr | Ala | Thr | Glu | Leu | Gly | Glu | Gly | Lys | Ile | Pro | Trp | Gly | Ser |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Met | Glu | Lys | Ala | Gly | Pro | Leu | Glu | Met | Ala | Gln | Leu | Leu | Ile | Thr | His |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Phe | Gly | Pro | Glu | Glu | Ala | Trp | Arg | Leu | Ala | Leu | Ser | Thr | Phe | Glu | Arg |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Ile | Asn | Arg | Lys | Asp | Leu | Trp | Glu | Arg | Gly | Gln |     |     |     |     |     |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     |     |

<210> 7  
 <211> 76  
 <212> PRT  
 <213> Homo sapien

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Thr | Leu | Glu | Glu | Leu | Val | Pro | Tyr | Asp | Phe | Glu | Lys | Phe | Lys | Phe | Lys |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Leu | Gln | Asn | Thr | Ser | Val | Gln | Lys | Glu | His | Ser | Arg | Ile | Pro | Arg | Ser |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Gln | Ile | Gln | Arg | Ala | Arg | Pro | Val | Lys | Met | Ala | Thr | Leu | Leu | Val | Thr |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Tyr | Tyr | Gly | Glu | Glu | Tyr | Ala | Val | Gln | Leu | Thr | Leu | Gln | Val | Leu | Arg |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Ala | Ile | Asn | Gln | Arg | Leu | Leu | Ala | Glu | Glu | Leu | His |     |     |     |     |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     |     |

<210> 8  
 <211> 71  
 <212> PRT  
 <213> Homo sapien

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Tyr | Leu | Glu | Asp | Leu | Glu | Asp | Val | Asp | Leu | Lys | Lys | Phe | Lys | Met | His |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Leu | Glu | Asp | Tyr | Pro | Pro | Gln | Lys | Gly | Cys | Ile | Pro | Leu | Pro | Arg | Gly |

[illegible]

```
<210> 9
<211> 76
<212> PRT
<213> Homo sapien
```

```

<400> 9
Ala Leu Glu Asn Leu Thr Ala Glu Glu Leu Lys Lys Phe Lys Leu Lys
 1             5             10             15
Leu Leu Ser Val Pro Leu Arg Glu Gly Tyr Gly Arg Ile Pro Arg Gly
          20          25          30
Ala Leu Leu Pro Met Asp Ala Leu Asp Leu Thr Asp Lys Leu Val Ser
      35      40      45
Phe Tyr Leu Glu Thr Tyr Gly Ala Glu Leu Thr Ala Asn Val Leu Arg
 50      55      60
Asp Met Gly Leu Gln Glu Met Ala Gly Gln Leu Gln
65      70      75

```

```
<210> 10
<211> 76
<212> PRT
<213> Homo sapien
```

```

<400> 10
Val Leu Glu Asn Leu Thr Pro Glu Glu Leu Lys Lys Phe Lys Met Lys
 1             5             10             15
Leu Gly Thr Val Pro Leu Arg Glu Gly Phe Glu Arg Ile Pro Arg Gly
      20             25             30
Ala Leu Gly Gln Leu Asp Ile Val Asp Leu Thr Asp Lys Leu Val Ala
      35             40             45
Ser Tyr Tyr Glu Asp Tyr Ala Ala Glu Leu Val Val Ala Val Leu Arg
 50             55             60
Asp Met Arg Met Leu Glu Glu Ala Ala Arg Leu Gln
65             70             75

```

```
<210> 11
<211> 76
<212> PRT
<213> Homo sapien
```

```
<400> 11
Tyr Leu Glu Phe Leu Lys Lys Glu Glu Leu Lys Glu Phe Gln Leu Leu
  1                      5                      10                     15
```

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Leu | Ala | Asn | Lys | Ala | His | Ser | Arg | Ser | Ser | Ser | Gly | Glu | Thr | Pro | Ala |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Gln | Pro | Glu | Lys | Thr | Ser | Gly | Met | Glu | Val | Ala | Ser | Tyr | Leu | Val | Ala |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Gln | Tyr | Gly | Glu | Gln | Arg | Ala | Trp | Asp | Leu | Ala | Leu | His | Thr | Trp | Glu |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Gln | Met | Gly | Leu | Arg | Ser | Leu | Cys | Ala | Gln | Ala | Gln |     |     |     |     |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     |     |

<210> 12  
 <211> 70  
 <212> PRT  
 <213> Homo sapien

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Leu | Asp | Asn | Ile | Thr | Asp | Glu | Glu | Leu | Asp | Arg | Phe | Lys | Phe | Phe |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Leu | Ser | Asp | Glu | Phe | Asn | Ile | Ala | Thr | Gly | Lys | Leu | His | Thr | Ala | Asn |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Arg | Ile | Gln | Val | Ala | Thr | Leu | Met | Ile | Gln | Asn | Ala | Gly | Ala | Val | Ser |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Ala | Val | Met | Lys | Thr | Ile | Arg | Ile | Phe | Gln | Lys | Leu | Asn | Tyr | Met | Leu |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Leu | Ala | Lys | Arg | Leu | Gln |     |     |     |     |     |     |     |     |     |     |
| 65  |     |     |     |     | 70  |     |     |     |     |     |     |     |     |     |     |

<210> 13  
 <211> 71  
 <212> PRT  
 <213> Homo sapien

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Leu | Glu | Val | Ile | Asn | Asp | Tyr | His | Phe | Arg | Met | Val | Lys | Ser | Leu |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Leu | Ser | Asn | Asp | Leu | Lys | Leu | Asn | Leu | Lys | Met | Arg | Glu | Glu | Tyr | Asp |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Lys | Ile | Gln | Ile | Ala | Asp | Leu | Met | Glu | Glu | Lys | Phe | Arg | Gly | Asp | Ala |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Gly | Leu | Gly | Lys | Leu | Ile | Lys | Ile | Phe | Glu | Asp | Ile | Pro | Thr | Leu | Glu |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Asp | Leu | Ala | Glu | Thr | Leu | Lys |     |     |     |     |     |     |     |     |     |
| 65  |     |     |     |     | 70  |     |     |     |     |     |     |     |     |     |     |

<210> 14  
 <211> 70  
 <212> PRT  
 <213> Myxoma virus

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Leu | Glu | Asn | Leu | Ser | Asp | Tyr | Gln | Phe | Lys | Met | Phe | Ile | Tyr | Leu |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

|   |    |    |    |
|---|----|----|----|
| 1   | 5  | 10 | 15 |
| Ala Met Glu Asp Leu Tyr Ile Glu Arg Ala Glu Lys Glu Lys Ile Asp |    |    |    |
| 20  | 25 | 30 |    |
| Arg Ile Asp Leu Ala His Lys Ile Ser Glu Gln Tyr Leu Gly Thr Asp |    |    |    |
| 35  | 40 | 45 |    |
| Tyr Ile Glu Phe Met Lys Arg Val Thr Asp Phe Ile Pro Asn Lys Val |    |    |    |
| 50  | 55 | 60 |    |
| Tyr Val Asp Ser Leu Leu   |    |    |    |
| 65  | 70 |    |    |

<210> 15  
 <211> 2985  
 <212> DNA  
 <213> Homo sapien

<220>  
 <221> CDS  
 <222> (1)...(2985)

<221> misc\_feature  
 <222> (1)...(1857)  
 <223> n = A,T,C or G

|   |     |
|---|-----|
| <400> 15  |     |
| atg gca gcc tct ttc ttc tct gat ttt ggt ctt atg tgg tat ctg gag | 48  |
| Met Ala Ala Ser Phe Phe Ser Asp Phe Gly Leu Met Trp Tyr Leu Glu |     |
| 1 5 10 15   |     |
| gag ctc aaa aag gag gag ttc agg aaa ttt aaa gaa cat ctc aag caa | 96  |
| Glu Leu Lys Lys Glu Glu Phe Arg Lys Phe Lys Glu His Leu Lys Gln |     |
| 20 25 30  |     |
| atg act ttg cag ctt gaa ctc aag cag att ccc tgg act gag gtc aaa | 144 |
| Met Thr Leu Gln Leu Glu Leu Lys Gln Ile Pro Trp Thr Glu Val Lys |     |
| 35 40 45  |     |
| aaa gca tcc cgg gaa gaa ctt gca aac ctc ttg atc aag cac tat gaa | 192 |
| Lys Ala Ser Arg Glu Glu Leu Ala Asn Leu Leu Ile Lys His Tyr Glu |     |
| 50 55 60  |     |
| gaa caa caa gct tgg aac ata acc tta aga atc ttt caa aag atg gat | 240 |
| Glu Gln Gln Ala Trp Asn Ile Thr Leu Arg Ile Phe Gln Lys Met Asp |     |
| 65 70 75 80   |     |
| aga aag gat ctc tgc atg aag gtc atg agg gag aga aca gga tac aca | 288 |
| Arg Lys Asp Leu Cys Met Lys Val Met Arg Glu Arg Thr Gly Tyr Thr |     |
| 85 90 95  |     |
| aag acc tat caa gct cac gca aag cag aaa ttc agc cgc tta tgg tcc | 336 |
| Lys Thr Tyr Gln Ala His Ala Lys Gln Lys Phe Ser Arg Leu Trp Ser |     |
| 100 105 110   |     |

|   |      |
|---|------|
| agc aag tct gtc act gag att cac cta tac ttt gag gag gaa gtc aag | 384  |
| Ser Lys Ser Val Thr Glu Ile His Leu Tyr Phe Glu Glu Glu Val Lys |      |
| 115 120 125   |      |
| caa gaa gaa tgt gac cat ttg gac cgc ctt ttt gct ccc aag gaa act | 432  |
| Gln Glu Glu Cys Asp His Leu Asp Arg Leu Phe Ala Pro Lys Glu Thr |      |
| 130 135 140   |      |
| ggg aaa cag cca cgt aca gtg att att caa gga cca caa gga att gga | 480  |
| Gly Lys Gln Pro Arg Thr Val Ile Ile Gln Gly Pro Gln Gly Ile Gly |      |
| 145 150 155 160   |      |
| aaa acg aca ctc ctg atg aag ctg atg atg gcc tgg tcg gac aac aag | 528  |
| Lys Thr Thr Leu Leu Met Lys Leu Met Met Ala Trp Ser Asp Asn Lys |      |
| 165 170 175   |      |
| atc ttt ggg gat agg ttc ctg tac acg ttc tat ttc tgc tgc aga gaa | 576  |
| Ile Phe Arg Asp Arg Phe Leu Tyr Thr Phe Tyr Phe Cys Cys Arg Glu |      |
| 180 185 190   |      |
| ctg agg gag ttg ccg cca acg agt ttg gct gac ttg att tcc aga gag | 624  |
| Leu Arg Glu Leu Pro Pro Thr Ser Leu Ala Asp Leu Ile Ser Arg Glu |      |
| 195 200 205   |      |
| tgg cct gac ccc gct gct cct ata aca gag atc gtg tct caa ccg gag | 672  |
| Trp Pro Asp Pro Ala Ala Pro Ile Thr Glu Ile Val Ser Gln Pro Glu |      |
| 210 215 220   |      |
| aga ctc ttg ttc gtc atc gac agc ttc gaa gag ctg cag ggc ggc ttg | 720  |
| Arg Leu Leu Phe Val Ile Asp Ser Phe Glu Glu Leu Gln Gly Gly Leu |      |
| 225 230 235 240   |      |
| aac gaa ccc gat tcg gat ctg tgt ggt gac ttg atg gag aaa cgg ccg | 768  |
| Asn Glu Pro Asp Ser Asp Leu Cys Gly Asp Leu Met Glu Lys Arg Pro |      |
| 245 250 255   |      |
| gtg cag gtg ctt ctg agc agt ttg ctg agg aag aag atg ctc ccg gag | 816  |
| Val Gln Val Leu Leu Ser Ser Leu Leu Arg Lys Lys Met Leu Pro Glu |      |
| 260 265 270   |      |
| gcc tcc ctg ctc atc gcc atc aaa ccc gtg tgc ccg aag gag ctc cgg | 864  |
| Ala Ser Leu Leu Ile Ala Ile Lys Pro Val Cys Pro Lys Glu Leu Arg |      |
| 275 280 285   |      |
| gat cag gtg acg atc tca gaa atc tac cag ccc cgg gga ttc aac gag | 912  |
| Asp Gln Val Thr Ile Ser Glu Ile Tyr Gln Pro Arg Gly Phe Asn Glu |      |
| 290 295 300   |      |
| agt gat agg tta gtg tat ttc tgc tgt ttc ttc aaa gac ccg aaa aga | 960  |
| Ser Asp Arg Leu Val Tyr Phe Cys Cys Phe Phe Lys Asp Pro Lys Arg |      |
| 305 310 315 320   |      |
| gcc atg gaa gcc ttc aat ctt gta aga gaa agt gaa cag ctg ttt tcc | 1008 |

|   |      |
|---|------|
| Ala Met Glu Ala Phe Asn Leu Val Arg Glu Ser Glu Gln Leu Phe Ser |      |
| 325 330 335   |      |
| ata tgc caa atc ccg ctc ctc tgc tgg atc ctg tgt acc agt ctg aag | 1056 |
| Ile Cys Gln Ile Pro Leu Leu Cys Trp Ile Leu Cys Thr Ser Leu Lys |      |
| 340 345 350   |      |
| caa gag atg cag aaa gga aaa gac ctg gcc ctg acc tgc cag agc act | 1104 |
| Gln Glu Met Gln Lys Gly Lys Asp Leu Ala Leu Thr Cys Gln Ser Thr |      |
| 355 360 365   |      |
| acc tct gtg tac tcc tct ttc gtc ttt aac ctg ttc aca cct gag ggt | 1152 |
| Thr Ser Val Tyr Ser Ser Phe Val Phe Asn Leu Phe Thr Pro Glu Gly |      |
| 370 375 380   |      |
| gcc gag ggc ccg act ccg caa acc cag cac cag ctg aag gcc ctg tgc | 1200 |
| Ala Glu Gly Pro Thr Pro Gln Thr Gln His Gln Leu Lys Ala Leu Cys |      |
| 385 390 395 400   |      |
| tcc ctg gct gca gag ggt atg tgg aca gac aca ttt gag ttt tgt gaa | 1248 |
| Ser Leu Ala Ala Glu Gly Met Trp Thr Asp Thr Phe Glu Phe Cys Glu |      |
| 405 410 415   |      |
| gac gac ctc cgg aga aat ggg gtt gtt gac gct gac atc cct gcg ctg | 1296 |
| Asp Asp Leu Arg Arg Asn Gly Val Val Asp Ala Asp Ile Pro Ala Leu |      |
| 420 425 430   |      |
| ctg ggc acc aag ata ctt ctg aag tac ggg gag cgt gag agc tcc tac | 1344 |
| Leu Gly Thr Lys Ile Leu Leu Lys Tyr Gly Glu Arg Glu Ser Ser Tyr |      |
| 435 440 445   |      |
| gtg ttc ctc cac gtg tgt atc cag gag ttc tgt gcc gcc ttg ttc tat | 1392 |
| Val Phe Leu His Val Cys Ile Gln Glu Phe Cys Ala Ala Leu Phe Tyr |      |
| 450 455 460   |      |
| ttg ctc aag agc cat ctt gat cat cct cac cca gct gtg aga tgt gta | 1440 |
| Leu Leu Lys Ser His Leu Asp His Pro His Pro Ala Val Arg Cys Val |      |
| 465 470 475 480   |      |
| cag gaa ttg cta gtt gcc aat ttt gaa aaa gca agg aga gca cat tgg | 1488 |
| Gln Glu Leu Leu Val Ala Asn Phe Glu Lys Ala Arg Arg Ala His Trp |      |
| 485 490 495   |      |
| att ttt ttg ggg tgt ttt cta act ggc ctt tta aat aaa aag gaa caa | 1536 |
| Ile Phe Leu Gly Cys Phe Leu Thr Gly Leu Leu Asn Lys Lys Glu Gln |      |
| 500 505 510   |      |
| gaa aaa ctg gat gcg ttt ttt ggc ttc caa ctg tcc caa gag ata aag | 1584 |
| Glu Lys Leu Asp Ala Phe Phe Gly Phe Gln Leu Ser Gln Glu Ile Lys |      |
| 515 520 525   |      |
| cag caa att cac cag tgc ctg aag agc tta ggg gag cgt ggc aat cct | 1632 |
| Gln Gln Ile His Gln Cys Leu Lys Ser Leu Gly Glu Arg Gly Asn Pro |      |



| 530   | 535 | 540 |      |
|---|-----|-----|------|
| cag gga cag gtg gat tcc ttg gcg ata ttt tac tgt ctc ttt gaa atg |     |     | 1680 |
| Gln Gly Gln Val Asp Ser Leu Ala Ile Phe Tyr Cys Leu Phe Glu Met |     |     |      |
| 545   | 550 | 555 | 560  |
| cag gat cct gcc ttt gtg aag cag gca gtg aac ctc ctc caa gaa gct |     |     | 1728 |
| Gln Asp Pro Ala Phe Val Lys Gln Ala Val Asn Leu Leu Gln Glu Ala |     |     |      |
|   | 565 | 570 | 575  |
| aac ttt cat att att gac aac gtg gac ttg gtg gtt tct gcc tac tgc |     |     | 1776 |
| Asn Phe His Ile Ile Asp Asn Val Asp Leu Val Val Ser Ala Tyr Cys |     |     |      |
|   | 580 | 585 | 590  |
| tta aaa tac tgc tcc agc ttg agg aaa ctc tgt ttt tcc gtt caa aat |     |     | 1824 |
| Leu Lys Tyr Cys Ser Ser Leu Arg Lys Leu Cys Phe Ser Val Gln Asn |     |     |      |
|   | 595 | 600 | 605  |
| gtc ttt aag aaa gag gat gaa cac agc tct acg tcg gat tac agc ctc |     |     | 1872 |
| Val Phe Lys Lys Glu Asp Glu His Ser Ser Thr Ser Asp Tyr Ser Leu |     |     |      |
| 610   | 615 | 620 |      |
| atc tgt tgg cat cac atc tgc tct gtg ctc acc acc agc ggg cac ctc |     |     | 1920 |
| Ile Cys Trp His His Ile Cys Ser Val Leu Thr Thr Ser Gly His Leu |     |     |      |
| 625   | 630 | 635 | 640  |
| aga gag ctc cag gtg cag gac agc acc ctc agc gag tcg acc ttt gtg |     |     | 1968 |
| Arg Glu Leu Gln Val Gln Asp Ser Thr Leu Ser Glu Ser Thr Phe Val |     |     |      |
|   | 645 | 650 | 655  |
| acc tgg tgt aac cag ctg agg cat ccc agc tgt cgc ctt cag aag ctt |     |     | 2016 |
| Thr Trp Cys Asn Gln Leu Arg His Pro Ser Cys Arg Leu Gln Lys Leu |     |     |      |
|   | 660 | 665 | 670  |
| gga ata aat aac gtt tcc ttt tct ggc cag agt gtt ctg ctc ttt gag |     |     | 2064 |
| Gly Ile Asn Asn Val Ser Phe Ser Gly Gln Ser Val Leu Leu Phe Glu |     |     |      |
|   | 675 | 680 | 685  |
| gtg ctc ttt tat cag cca gac ttg aaa tac ctg agc ttc acc ctc acg |     |     | 2112 |
| Val Leu Phe Tyr Gln Pro Asp Leu Lys Tyr Leu Ser Phe Thr Leu Thr |     |     |      |
| 690   | 695 | 700 |      |
| aaa ctc tct cgt gat gac atc agg tcc ctc tgt gat gcc ttg aac tac |     |     | 2160 |
| Lys Leu Ser Arg Asp Asp Ile Arg Ser Leu Cys Asp Ala Leu Asn Tyr |     |     |      |
| 705   | 710 | 715 | 720  |
| cca gca ggc aac gtc aaa gag cta gcg ctg gta aat tgt cac ctc tca |     |     | 2208 |
| Pro Ala Gly Asn Val Lys Glu Leu Ala Leu Val Asn Cys His Leu Ser |     |     |      |
|   | 725 | 730 | 735  |
| ccc att gat tgt gaa gtc ctt gct ggc ctt cta acc aac aac aag aag |     |     | 2256 |
| Pro Ile Asp Cys Glu Val Leu Ala Gly Leu Leu Thr Asn Asn Lys Lys |     |     |      |
|   | 740 | 745 | 750  |

|   |      |
|---|------|
| ctg acg tat ctg aat gta tcc tgc aac cag tta gac aca ggc gtg ccc | 2304 |
| Leu Thr Tyr Leu Asn Val Ser Cys Asn Gln Leu Asp Thr Gly Val Pro |      |
| 755 760 765   |      |
| ctt ttg tgt gaa gcc ctg tgc agc cca gac acg gtc ctg gta tac ctg | 2352 |
| Leu Leu Cys Glu Ala Leu Cys Ser Pro Asp Thr Val Leu Val Tyr Leu |      |
| 770 775 780   |      |
| atg ttg gct ttc tgc cac ctc agc gag cag tgc tgc gaa tac atc tct | 2400 |
| Met Leu Ala Phe Cys His Leu Ser Glu Gln Cys Cys Glu Tyr Ile Ser |      |
| 785 790 795 800   |      |
| gaa atg ctt ctg cgt aac aag agc gtg cgc tat cta gac ctc agt gcc | 2448 |
| Glu Met Leu Leu Arg Asn Lys Ser Val Arg Tyr Leu Asp Leu Ser Ala |      |
| 805 810 815   |      |
| aat gtc ctg aag gac gaa gga ctg aaa act ctc tgc gag gcc ttg aaa | 2496 |
| Asn Val Leu Lys Asp Glu Gly Leu Lys Thr Leu Cys Glu Ala Leu Lys |      |
| 820 825 830   |      |
| cat ccg gac tgc tgc ctg gat tca ctg tgt ttg gta aaa tgt ttt atc | 2544 |
| His Pro Asp Cys Cys Leu Asp Ser Leu Cys Leu Val Lys Cys Phe Ile |      |
| 835 840 845   |      |
| act gct gct ggc tgt gaa gac ctc gcc tct gct ctc atc agc aat caa | 2592 |
| Thr Ala Ala Gly Cys Glu Asp Leu Ala Ser Ala Leu Ile Ser Asn Gln |      |
| 850 855 860   |      |
| aac ctg aag att ctg caa att ggg tgc aat gaa atc gga gat gtg ggt | 2640 |
| Asn Leu Lys Ile Leu Gln Ile Gly Cys Asn Glu Ile Gly Asp Val Gly |      |
| 865 870 875 880   |      |
| gtg cag ctg ttg tgt cgg gct ctg acg cat acg gat tgc cgc tta gag | 2688 |
| Val Gln Leu Leu Cys Arg Ala Leu Thr His Thr Asp Cys Arg Leu Glu |      |
| 885 890 895   |      |
| att ctt ggg ttg gaa gaa tgt ggg tta acg agc acc tgc tgt aag gat | 2736 |
| Ile Leu Gly Leu Glu Glu Cys Gly Leu Thr Ser Thr Cys Cys Lys Asp |      |
| 900 905 910   |      |
| ctc gcg tct gtt ctc acc tgc agt aag acc ctg cag cag ctc aac ctg | 2784 |
| Leu Ala Ser Val Leu Thr Cys Ser Lys Thr Leu Gln Gln Leu Asn Leu |      |
| 915 920 925   |      |
| acc ttg aac acc ttg gac cac aca ggg gtg gtt gta ctc tgt gag gcc | 2832 |
| Thr Leu Asn Thr Leu Asp His Thr Gly Val Val Leu Leu Cys Glu Ala |      |
| 930 935 940   |      |
| ctg aga cac cca gag tgt gcc ctg cag gtg ctc ggg ctg aga aaa act | 2880 |
| Leu Arg His Pro Glu Cys Ala Leu Gln Val Leu Gly Leu Arg Lys Thr |      |
| 945 950 955 960   |      |

gat ttt gat gag gaa acc cag gca ctt ctg acg gct gag gaa gag aga 2928  
 Asp Phe Asp Glu Glu Thr Gln Ala Leu Leu Thr Ala Glu Glu Glu Arg  
                   965                                  970                                  975

aat cct aac ctg acc atc aca gac gac tgt gac aca atc aca agg gta 2976  
 Asn Pro Asn Leu Thr Ile Thr Asp Asp Cys Asp Thr Ile Thr Arg Val  
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gag atc tga 2985  
 Glu Ile \*

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                   20                                  25                                  30  
 Met Thr Leu Gln Leu Glu Leu Lys Gln Ile Pro Trp Thr Glu Val Lys  
                   35                                  40                                  45  
 Lys Ala Ser Arg Glu Glu Leu Ala Asn Leu Leu Ile Lys His Tyr Glu  
                   50                                  55                                  60  
 Glu Gln Gln Ala Trp Asn Ile Thr Leu Arg Ile Phe Gln Lys Met Asp  
  65                                  70                                  75                                  80  
 Arg Lys Asp Leu Cys Met Lys Val Met Arg Glu Arg Thr Gly Tyr Thr  
                   85                                  90                                  95  
 Lys Thr Tyr Gln Ala His Ala Lys Gln Lys Phe Ser Arg Leu Trp Ser  
                   100                                  105                                  110  
 Ser Lys Ser Val Thr Glu Ile His Leu Tyr Phe Glu Glu Glu Val Lys  
                   115                                  120                                  125  
 Gln Glu Glu Cys Asp His Leu Asp Arg Leu Phe Ala Pro Lys Glu Thr  
                   130                                  135                                  140  
 Gly Lys Gln Pro Arg Thr Val Ile Ile Gln Gly Pro Gln Gly Ile Gly  
  145                                  150                                  155                                  160  
 Lys Thr Thr Leu Leu Met Lys Leu Met Met Ala Trp Ser Asp Asn Lys  
                   165                                  170                                  175  
 Ile Phe Arg Asp Arg Phe Leu Tyr Thr Phe Tyr Phe Cys Cys Arg Glu  
                   180                                  185                                  190  
 Leu Arg Glu Leu Pro Pro Thr Ser Leu Ala Asp Leu Ile Ser Arg Glu  
                   195                                  200                                  205  
 Trp Pro Asp Pro Ala Ala Pro Ile Thr Glu Ile Val Ser Gln Pro Glu  
                   210                                  215                                  220  
 Arg Leu Leu Phe Val Ile Asp Ser Phe Glu Glu Leu Gln Gly Gly Leu  
  225                                  230                                  235                                  240  
 Asn Glu Pro Asp Ser Asp Leu Cys Gly Asp Leu Met Glu Lys Arg Pro  
                   245                                  250                                  255  
 Val Gln Val Leu Leu Ser Ser Leu Leu Arg Lys Lys Met Leu Pro Glu  
                   260                                  265                                  270

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Ala | Ser | Leu | Leu | Ile | Ala | Ile | Lys | Pro | Val | Cys | Pro | Lys | Glu | Leu | Arg |  |
|     |     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |  |
| Asp | Gln | Val | Thr | Ile | Ser | Glu | Ile | Tyr | Gln | Pro | Arg | Gly | Phe | Asn | Glu |  |
|     |     | 290 |     |     |     |     | 295 |     |     |     | 300 |     |     |     |     |  |
| Ser | Asp | Arg | Leu | Val | Tyr | Phe | Cys | Cys | Phe | Phe | Lys | Asp | Pro | Lys | Arg |  |
| 305 |     |     |     |     | 310 |     |     |     |     |     | 315 |     |     |     | 320 |  |
| Ala | Met | Glu | Ala | Phe | Asn | Leu | Val | Arg | Glu | Ser | Glu | Gln | Leu | Phe | Ser |  |
|     |     |     |     | 325 |     |     |     |     |     |     | 330 |     |     |     | 335 |  |
| Ile | Cys | Gln | Ile | Pro | Leu | Leu | Cys | Trp | Ile | Leu | Cys | Thr | Ser | Leu | Lys |  |
|     |     |     | 340 |     |     |     |     |     |     |     |     |     |     | 350 |     |  |
| Gln | Glu | Met | Gln | Lys | Gly | Lys | Asp | Leu | Ala | Leu | Thr | Cys | Gln | Ser | Thr |  |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     |     |     | 365 |     |  |
| Thr | Ser | Val | Tyr | Ser | Ser | Phe | Val | Phe | Asn | Leu | Phe | Thr | Pro | Glu | Gly |  |
|     |     | 370 |     |     |     |     | 375 |     |     |     |     | 380 |     |     |     |  |
| Ala | Glu | Gly | Pro | Thr | Pro | Gln | Thr | Gln | His | Gln | Leu | Lys | Ala | Leu | Cys |  |
| 385 |     |     |     |     | 390 |     |     |     |     |     | 395 |     |     |     | 400 |  |
| Ser | Leu | Ala | Ala | Glu | Gly | Met | Trp | Thr | Asp | Thr | Phe | Glu | Phe | Cys | Glu |  |
|     |     |     |     | 405 |     |     |     |     |     |     | 410 |     |     |     | 415 |  |
| Asp | Asp | Leu | Arg | Arg | Asn | Gly | Val | Val | Asp | Ala | Asp | Ile | Pro | Ala | Leu |  |
|     |     |     | 420 |     |     |     |     |     | 425 |     |     |     |     | 430 |     |  |
| Leu | Gly | Thr | Lys | Ile | Leu | Leu | Lys | Tyr | Gly | Glu | Arg | Glu | Ser | Ser | Tyr |  |
|     |     | 435 |     |     |     |     |     | 440 |     |     |     |     |     | 445 |     |  |
| Val | Phe | Leu | His | Val | Cys | Ile | Gln | Glu | Phe | Cys | Ala | Ala | Leu | Phe | Tyr |  |
|     |     | 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |  |
| Leu | Leu | Lys | Ser | His | Leu | Asp | His | Pro | His | Pro | Ala | Val | Arg | Cys | Val |  |
| 465 |     |     |     |     | 470 |     |     |     |     |     | 475 |     |     |     | 480 |  |
| Gln | Glu | Leu | Leu | Val | Ala | Asn | Phe | Glu | Lys | Ala | Arg | Arg | Ala | His | Trp |  |
|     |     |     |     | 485 |     |     |     |     |     |     | 490 |     |     |     | 495 |  |
| Ile | Phe | Leu | Gly | Cys | Phe | Leu | Thr | Gly | Leu | Leu | Asn | Lys | Lys | Glu | Gln |  |
|     |     |     | 500 |     |     |     |     |     | 505 |     |     |     |     | 510 |     |  |
| Glu | Lys | Leu | Asp | Ala | Phe | Phe | Gly | Phe | Gln | Leu | Ser | Gln | Glu | Ile | Lys |  |
|     |     | 515 |     |     |     |     |     | 520 |     |     |     |     | 525 |     |     |  |
| Gln | Gln | Ile | His | Gln | Cys | Leu | Lys | Ser | Leu | Gly | Glu | Arg | Gly | Asn | Pro |  |
|     |     | 530 |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |  |
| Gln | Gly | Gln | Val | Asp | Ser | Leu | Ala | Ile | Phe | Tyr | Cys | Leu | Phe | Glu | Met |  |
| 545 |     |     |     |     | 550 |     |     |     |     |     | 555 |     |     |     | 560 |  |
| Gln | Asp | Pro | Ala | Phe | Val | Lys | Gln | Ala | Val | Asn | Leu | Leu | Gln | Glu | Ala |  |
|     |     |     |     | 565 |     |     |     |     |     | 570 |     |     |     |     | 575 |  |
| Asn | Phe | His | Ile | Asp | Asn | Val | Asp | Leu | Val | Val | Ser | Ala | Tyr | Cys |     |  |
|     |     | 580 |     |     |     |     |     | 585 |     |     |     |     | 590 |     |     |  |
| Leu | Lys | Tyr | Cys | Ser | Ser | Leu | Arg | Lys | Leu | Cys | Phe | Ser | Val | Gln | Asn |  |
|     |     | 595 |     |     |     |     |     | 600 |     |     |     |     | 605 |     |     |  |
| Val | Phe | Lys | Lys | Glu | Asp |     |     |     |     |     |     |     |     |     |     |  |

|   |     |     |
|---|-----|-----|
| 690   | 695 | 700 |
| Lys Leu Ser Arg Asp Asp Ile Arg Ser Leu Cys Asp Ala Leu Asn Tyr |     |     |
| 705   | 710 | 715 |
| Pro Ala Gly Asn Val Lys Glu Leu Ala Leu Val Asn Cys His Leu Ser |     |     |
|   | 725 | 730 |
| Pro Ile Asp Cys Glu Val Leu Ala Gly Leu Leu Thr Asn Asn Lys Lys |     |     |
|   | 740 | 745 |
| Leu Thr Tyr Leu Asn Val Ser Cys Asn Gln Leu Asp Thr Gly Val Pro |     |     |
|   | 755 | 760 |
| Leu Leu Cys Glu Ala Leu Cys Ser Pro Asp Thr Val Leu Val Tyr Leu |     |     |
|   | 770 | 775 |
| Met Leu Ala Phe Cys His Leu Ser Glu Gln Cys Cys Glu Tyr Ile Ser |     |     |
|   | 785 | 790 |
| Glu Met Leu Leu Arg Asn Lys Ser Val Arg Tyr Leu Asp Leu Ser Ala |     |     |
|   | 805 | 810 |
| Asn Val Leu Lys Asp Glu Gly Leu Lys Thr Leu Cys Glu Ala Leu Lys |     |     |
|   | 820 | 825 |
| His Pro Asp Cys Cys Leu Asp Ser Leu Cys Leu Val Lys Cys Phe Ile |     |     |
|   | 835 | 840 |
| Thr Ala Ala Gly Cys Glu Asp Leu Ala Ser Ala Leu Ile Ser Asn Gln |     |     |
|   | 850 | 855 |
| Asn Leu Lys Ile Leu Gln Ile Gly Cys Asn Glu Ile Gly Asp Val Gly |     |     |
|   | 865 | 870 |
| Val Gln Leu Leu Cys Arg Ala Leu Thr His Thr Asp Cys Arg Leu Glu |     |     |
|   | 885 | 890 |
| Ile Leu Gly Leu Glu Glu Cys Gly Leu Thr Ser Thr Cys Cys Lys Asp |     |     |
|   | 900 | 905 |
| Leu Ala Ser Val Leu Thr Cys Ser Lys Thr Leu Gln Gln Leu Asn Leu |     |     |
|   | 915 | 920 |
| Thr Leu Asn Thr Leu Asp His Thr Gly Val Val Val Leu Cys Glu Ala |     |     |
|   | 930 | 935 |
| Leu Arg His Pro Glu Cys Ala Leu Gln Val Leu Gly Leu Arg Lys Thr |     |     |
|   | 945 | 950 |
| Asp Phe Asp Glu Glu Thr Gln Ala Leu Leu Thr Ala Glu Glu Glu Arg |     |     |
|   | 965 | 970 |
| Asn Pro Asn Leu Thr Ile Thr Asp Asp Cys Asp Thr Ile Thr Arg Val |     |     |
|   | 980 | 985 |
| Glu Ile   |     | 990 |

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 <221> CDS  
 <222> (1)...(2841)

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| 1   | 5 | 10  | 15  |     |
|---|---|-----|-----|-----|
| gtg gcc cgc gag ctg ctc ctg gct gcg ctg gag gaa ctg agc caa gag |   |     |     | 96  |
| Val Ala Arg Glu Leu Leu Leu Ala Ala Leu Glu Glu Leu Ser Gln Glu |   |     |     |     |
| 20  |   | 25  | 30  |     |
| cag ctg aag cgc ttc cgc cac aag ctg cgc gac gtg ggc ccg gac gga |   |     |     | 144 |
| Gln Leu Lys Arg Phe Arg His Lys Leu Arg Asp Val Gly Pro Asp Gly |   |     |     |     |
| 35  |   | 40  | 45  |     |
| cgc agc atc ccg tgg ggg cgg ctg gag cgc gcg gac gcc gtg gac ctc |   |     |     | 192 |
| Arg Ser Ile Pro Trp Gly Arg Leu Glu Arg Ala Asp Ala Val Asp Leu |   |     |     |     |
| 50  |   | 55  | 60  |     |
| gcg gag cag ctg gcc cag ttc tac ggc ccg gag cct gcc ctg gag gtg |   |     |     | 240 |
| Ala Glu Gln Leu Ala Gln Phe Tyr Gly Pro Glu Pro Ala Leu Glu Val |   |     |     |     |
| 65  |   | 70  | 75  | 80  |
| gcc cgc aag acc ctc aag agg gcg gac gcg cgc gac gtg gcg gcg cag |   |     |     | 288 |
| Ala Arg Lys Thr Leu Lys Arg Ala Asp Ala Arg Asp Val Ala Ala Gln |   |     |     |     |
| 85  |   | 90  | 95  |     |
| ctc cag gag cgg cgg ctg cag cgg ctc ggg ctc ggc tcc ggg acg ctg |   |     |     | 336 |
| Leu Gln Glu Arg Arg Leu Gln Arg Leu Gly Leu Gly Ser Gly Thr Leu |   |     |     |     |
| 100   |   | 105 | 110 |     |
| ctc tcc gtg tcc gag tac aag aag aag tac cgg gag cac gtg ctg cag |   |     |     | 384 |
| Leu Ser Val Ser Glu Tyr Lys Lys Lys Tyr Arg Glu His Val Leu Gln |   |     |     |     |
| 115   |   | 120 | 125 |     |
| ctg cac gct cgg gtg aag gag agg aac gcc cgc tcc gtg aag atc acc |   |     |     | 432 |
| Leu His Ala Arg Val Lys Glu Arg Asn Ala Arg Ser Val Lys Ile Thr |   |     |     |     |
| 130   |   | 135 | 140 |     |
| aag cgc ttc acc aag ctg ctc atc gcg ccc gag agc gcc gcc ccg gag |   |     |     | 480 |
| Lys Arg Phe Thr Lys Leu Leu Ile Ala Pro Glu Ser Ala Ala Pro Glu |   |     |     |     |
| 145   |   | 150 | 155 | 160 |
| gag gcg ctg ggg ccc gcg gaa gag cct gag ccg ggg cgc gcg cgg cgc |   |     |     | 528 |
| Glu Ala Leu Gly Pro Ala Glu Glu Pro Glu Pro Gly Arg Ala Arg Arg |   |     |     |     |
| 165   |   | 170 | 175 |     |
| tcg gac acg cac act ttc aac cgc ctc ttc cgc cgc gac gag gag ggc |   |     |     | 576 |
| Ser Asp Thr His Thr Phe Asn Arg Leu Phe Arg Arg Asp Glu Glu Gly |   |     |     |     |
| 180   |   | 185 | 190 |     |
| cgg cgg ccg ctg acc gtg gtg ctg cag ggc ccg gcg ggc atc ggc aag |   |     |     | 624 |
| Arg Arg Pro Leu Thr Val Val Leu Gln Gly Pro Ala Gly Ile Gly Lys |   |     |     |     |
| 195   |   | 200 | 205 |     |
| acc atg gcg gcc aaa aag atc ctg tac gac tgg gcg gcg ggc aag ctg |   |     |     | 672 |
| Thr Met Ala Ala Lys Lys Ile Leu Tyr Asp Trp Ala Ala Gly Lys Leu |   |     |     |     |
| 210   |   | 215 | 220 |     |

|  |      |
|--|------|
| tac cag ggc cag gtg gac ttc gcc ttc ttc atg ccc tgc ggc gag ctg  | 720  |
| Tyr Gln Gly Gln Val Asp Phe Ala Phe Phe Met Pro Cys Gly Glu Leu  |      |
| 225 230 235 240  |      |
| ctg gag agg ccg ggc acg cgc agc ctg gct gac ctg atc ctg gac cag  | 768  |
| Leu Glu Arg Pro Gly Thr Arg Ser Leu Ala Asp Leu Ile Leu Asp Gln  |      |
| 245 250 255  |      |
| tgc ccc gac cgc ggc gcg ccg gtg ccg cag atg ctg gcc cag ccg cag  | 816  |
| Cys Pro Asp Arg Gly Ala Pro Val Pro Gln Met Leu Ala Gln Pro Gln  |      |
| 260 265 270  |      |
| cgg ctg ctc ttc atc ctg gac ggc gcg gac gag ctg ccg gcg ctg ggg  | 864  |
| Arg Leu Leu Phe Ile Leu Asp Gly Ala Asp Glu Leu Pro Ala Leu Gly  |      |
| 275 280 285  |      |
| ggc ccc gag gcc gcg ccc tgc aca gac ccc ttc gag gcg gcg agc ggc  | 912  |
| Gly Pro Glu Ala Ala Pro Cys Thr Asp Pro Phe Glu Ala Ala Ser Gly  |      |
| 290 295 300  |      |
| gcg cgg gtg cta ggc ggg ctg ctg agc aag gcg ctg ctg ccc acg gcc  | 960  |
| Ala Arg Val Leu Gly Gly Leu Leu Ser Lys Ala Leu Leu Pro Thr Ala  |      |
| 305 310 315 320  |      |
| ctc ctg ctg gtg acc acg cgc gcc gcc gcc ccc ggg agg ctg cag ggc  | 1008 |
| Leu Leu Leu Val Thr Thr Arg Ala Ala Ala Pro Gly Arg Leu Gln Gly  |      |
| 325 330 335  |      |
| cgc ctg tgt tcc ccg cag tgc gcc gag gtg cgc ggc ttc tcc gac aag  | 1056 |
| Arg Leu Cys Ser Pro Gln Cys Ala Glu Val Arg Gly Phe Ser Asp Lys  |      |
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| gac, aag aag aag tat ttc tac aag ttc ttc cgg gat gag agg agg gcc | 1104 |
| Asp Lys Lys Lys Tyr Phe Tyr Lys Phe Phe Arg Asp Glu Arg Arg Ala  |      |
| 355 360 365  |      |
| gag cgc gcc tac cgc ttc gtg aag gag aac gag acg ctg ttc gcg ctg  | 1152 |
| Glu Arg Ala Tyr Arg Phe Val Lys Glu Asn Glu Thr Leu Phe Ala Leu  |      |
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| tgc ttc gtg ccc ttc gtg tgc tgg atc gtg tgc acc gtg ctg cgc cag  | 1200 |
| Cys Phe Val Pro Phe Val Cys Trp Ile Val Cys Thr Val Leu Arg Gln  |      |
| 385 390 395 400  |      |
| cag ctg gag ctc ggt cgg gac ctg tcg cgc acg tcc aag acc acc acg  | 1248 |
| Gln Leu Glu Leu Gly Arg Asp Leu Ser Arg Thr Ser Lys Thr Thr Thr  |      |
| 405 410 415  |      |
| tca gtg tac ctg ctt ttc atc acc agc gtt ctg agc tcg gct ccg gta  | 1296 |
| Ser Val Tyr Leu Leu Phe Ile Thr Ser Val Leu Ser Ser Ala Pro Val  |      |
| 420 425 430  |      |

|   |      |
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| gcc gac ggg ccc cgg ttg cag ggc gac ctg cgc aat ctg tgc cgc ctg | 1344 |
| Ala Asp Gly Pro Arg Leu Gln Gly Asp Leu Arg Asn Leu Cys Arg Leu |      |
| 435 440 445   |      |
| gcc cgc gag ggc gtc ctc gga cgc agg gcg cag ttt gcc gag aag gaa | 1392 |
| Ala Arg Glu Gly Val Leu Gly Arg Arg Ala Gln Phe Ala Glu Lys Glu |      |
| 450 455 460   |      |
| ctg gag caa ctg gag ctt cgt ggc tcc aaa gtg cag acg ctg ttt ctc | 1440 |
| Leu Glu Gln Leu Glu Leu Arg Gly Ser Lys Val Gln Thr Leu Phe Leu |      |
| 465 470 475 480   |      |
| agc aaa aag gag ctg ccg ggc gtg ctg gag aca gag gtc acc tac cag | 1488 |
| Ser Lys Lys Glu Leu Pro Gly Val Leu Glu Thr Glu Val Thr Tyr Gln |      |
| 485 490 495   |      |
| ttc atc gac cag agc ttc cag gag ttc ctc gcg gca ctg tcc tac ctg | 1536 |
| Phe Ile Asp Gln Ser Phe Gln Glu Phe Leu Ala Ala Leu Ser Tyr Leu |      |
| 500 505 510   |      |
| ctg gag gac ggc ggg gtg ccc agg acc gcg gct ggc ggc gtt ggg aca | 1584 |
| Leu Glu Asp Gly Gly Val Pro Arg Thr Ala Ala Gly Gly Val Gly Thr |      |
| 515 520 525   |      |
| ctc ctg cgt ggg gac gcc cag ccg cac agc cac ttg gtg ctc acc acg | 1632 |
| Leu Leu Arg Gly Asp Ala Gln Pro His Ser His Leu Val Leu Thr Thr |      |
| 530 535 540   |      |
| cgc ttc ctc ttc gga ctg ctg agc gcg gag cgg atg cgc gac atc gag | 1680 |
| Arg Phe Leu Phe Gly Leu Leu Ser Ala Glu Arg Met Arg Asp Ile Glu |      |
| 545 550 555 560   |      |
| cgc cac ttc ggc tgc atg gtt tca gag cgt gtg aag cag gag gcc ctg | 1728 |
| Arg His Phe Gly Cys Met Val Ser Glu Arg Val Lys Gln Glu Ala Leu |      |
| 565 570 575   |      |
| cgg tgg gtg cag gga cag gga cag ggc tgc ccc gga gtg gca cca gag | 1776 |
| Arg Trp Val Gln Gly Gln Gly Gln Gly Cys Pro Gly Val Ala Pro Glu |      |
| 580 585 590   |      |
| gtg acc gag ggg gcc aaa ggg ctc gag gac acc gaa gag cca gag gag | 1824 |
| Val Thr Glu Gly Ala Lys Gly Leu Glu Asp Thr Glu Glu Pro Glu Glu |      |
| 595 600 605   |      |
| gag gag gag gga gag gag ccc aac tac cca ctg gag ttg ctg tac tgc | 1872 |
| Glu Glu Glu Gly Glu Glu Pro Asn Tyr Pro Leu Glu Leu Leu Tyr Cys |      |
| 610 615 620   |      |
| ctg tac gag acg cag gag gac gcg ttt gtg cgc caa gcc ctg tgc cgg | 1920 |
| Leu Tyr Glu Thr Gln Glu Asp Ala Phe Val Arg Gln Ala Leu Cys Arg |      |
| 625 630 635 640   |      |
| ttc ccg gag ctg gcg ctg cag cga gtg cgc ttc tgc cgc atg gac gtg | 1968 |



|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Phe | Pro | Glu | Leu | Ala | Leu | Gln | Arg | Val | Arg | Phe | Cys | Arg | Met | Asp | Val |      |
|     |     |     |     | 645 |     |     |     |     | 650 |     |     |     |     | 655 |     |      |
| gct | gtt | ctg | agc | tac | tgc | gtg | agg | tgc | tgc | cct | gct | gga | cag | gca | ctg | 2016 |
| Ala | Val | Leu | Ser | Tyr | Cys | Val | Arg | Cys | Cys | Pro | Ala | Gly | Gln | Ala | Leu |      |
|     |     |     | 660 |     |     |     |     | 665 |     |     |     |     | 670 |     |     |      |
| cgg | ctg | atc | agc | tgc | aga | ttg | gtt | gct | gcg | cag | gag | aag | aag | aag | aag | 2064 |
| Arg | Leu | Ile | Ser | Cys | Arg | Leu | Val | Ala | Ala | Gln | Glu | Lys | Lys | Lys | Lys |      |
|     |     | 675 |     |     |     |     | 680 |     |     |     |     | 685 |     |     |     |      |
| agc | ctg | ggg | aag | cgg | ctc | cag | gcc | agc | ctg | ggg | ggc | ggc | agc | tgg | ctg | 2112 |
| Ser | Leu | Gly | Lys | Arg | Leu | Gln | Ala | Ser | Leu | Gly | Gly | Gly | Ser | Trp | Leu |      |
|     | 690 |     |     |     |     | 695 |     |     |     | 700 |     |     |     |     |     |      |
| ggg | acc | caa | ctg | gct | cca | gaa | gta | ccc | ttt | cga | cca | ccc | tgc | tgt | gac | 2160 |
| Gly | Thr | Gln | Leu | Ala | Pro | Glu | Val | Pro | Phe | Arg | Pro | Pro | Cys | Cys | Asp |      |
| 705 |     |     |     |     | 710 |     |     |     | 715 |     |     |     |     |     | 720 |      |
| atc | tgc | ccc | aca | cct | cca | cca | gac | cct | cgg | ctc | ctc | cag | ggc | aag | gct | 2208 |
| Ile | Cys | Pro | Thr | Pro | Pro | Pro | Asp | Pro | Arg | Leu | Leu | Gln | Gly | Lys | Ala |      |
|     |     |     | 725 |     |     |     |     | 730 |     |     |     |     | 735 |     |     |      |
| ttt | gcc | aga | gtt | cct | ttg | aat | ata | gct | cca | att | cag | ccc | ctg | ccc | agg | 2256 |
| Phe | Ala | Arg | Val | Pro | Leu | Asn | Ile | Ala | Pro | Ile | Gln | Pro | Leu | Pro | Arg |      |
|     |     |     | 740 |     |     |     |     | 745 |     |     |     |     | 750 |     |     |      |
| ggc | ttg | gca | tct | gtt | gag | agg | atg | aat | gtc | acg | gtg | ttg | gca | ggg | gct | 2304 |
| Gly | Leu | Ala | Ser | Val | Glu | Arg | Met | Asn | Val | Thr | Val | Leu | Ala | Gly | Ala |      |
|     | 755 |     |     |     |     |     | 760 |     |     |     |     | 765 |     |     |     |      |
| ggg | cct | ggg | gac | cca | aag | acc | cat | gca | atg | act | gac | cca | ctg | tgc | cat | 2352 |
| Gly | Pro | Gly | Asp | Pro | Lys | Thr | His | Ala | Met | Thr | Asp | Pro | Leu | Cys | His |      |
|     | 770 |     |     |     |     | 775 |     |     |     |     | 780 |     |     |     |     |      |
| ctg | agc | agc | ctc | acg | ctg | tcc | cac | tgc | aaa | ctc | cct | gac | gcg | gtc | tgc | 2400 |
| Leu | Ser | Ser | Leu | Thr | Leu | Ser | His | Cys | Lys | Leu | Pro | Asp | Ala | Val | Cys |      |
| 785 |     |     |     |     | 790 |     |     |     |     | 795 |     |     |     |     | 800 |      |
| cga | gac | ctt | tct | gag | gcc | ctg | agg | gca | gcc | ccc | gca | ctg | acg | gag | ctg | 2448 |
| Arg | Asp | Leu | Ser | Glu | Ala | Leu | Arg | Ala | Ala | Pro | Ala | Leu | Thr | Glu | Leu |      |
|     |     |     |     | 805 |     |     |     | 810 |     |     |     |     | 815 |     |     |      |
| ggc | ctc | ctc | cac | aac | agg | ctc | agt | gag | gca | gga | ctg | cgt | atg | ctg | agt | 2496 |
| Gly | Leu | Leu | His | Asn | Arg | Leu | Ser | Glu | Ala | Gly | Leu | Arg | Met | Leu | Ser |      |
|     |     |     | 820 |     |     |     |     | 825 |     |     |     |     | 830 |     |     |      |
| gag | ggc | cta | gcc | tgg | ccg | cag | tgc | agg | gtg | cag | acg | gtc | agg | gta | cag | 2544 |
| Glu | Gly | Leu | Ala | Trp | Pro | Gln | Cys | Arg | Val | Gln | Thr | Val | Arg | Val | Gln |      |
|     |     | 835 |     |     |     |     | 840 |     |     |     |     | 845 |     |     |     |      |
| ctg | cct | gac | ccc | cag | cga | ggg | ctc | cag | tac | ctg | gtg | ggg | atg | ctt | cgg | 2592 |
| Leu | Pro | Asp | Pro | Gln | Arg | Gly | Leu | Gln | Tyr | Leu | Val | Gly | Met | Leu | Arg |      |

| 850   | 855 | 860 |      |
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| cag agc cct gcc ctg acc acc ctg gat ctc agc ggc tgc caa ctg ccc |     |     | 2640 |
| Gln Ser Pro Ala Leu Thr Thr Leu Asp Leu Ser Gly Cys Gln Leu Pro |     |     |      |
| 865   | 870 | 875 | 380  |
| gcc ccc atg gtg acc tac ctg tgt gca gtc ctg cag cac cag gga tgc |     |     | 2688 |
| Ala Pro Met Val Thr Tyr Leu Cys Ala Val Leu Gln His Gln Gly Cys |     |     |      |
|   | 885 | 890 | 895  |
| ggc ctg cag acc ctc agt ctg gcc tct gtg gag ctg agc gag cag tca |     |     | 2736 |
| Gly Leu Gln Thr Leu Ser Leu Ala Ser Val Glu Leu Ser Glu Gln Ser |     |     |      |
|   | 900 | 905 | 910  |
| cta cag gag ctt cag gct gtg aag aga gca aag ccg gat ctg gtc atc |     |     | 2784 |
| Leu Gln Glu Leu Gln Ala Val Lys Arg Ala Lys Pro Asp Leu Val Ile |     |     |      |
|   | 915 | 920 | 925  |
| aca cac cca gcg ctg gac ggc cac cca caa cct ccc aag gaa ctc atc |     |     | 2832 |
| Thr His Pro Ala Leu Asp Gly His Pro Gln Pro Pro Lys Glu Leu Ile |     |     |      |
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| Ser Thr Phe   |     |     |      |
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 Lys Arg Phe Thr Lys Leu Leu Ile Ala Pro Glu Ser Ala Ala Pro Glu  
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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| Glu | Ala | Leu | Gly | Pro | Ala | Glu | Glu | Pro | Glu | Pro | Gly | Arg | Ala | Arg | Arg |  |  |
|     |     |     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |  |  |
| Ser | Asp | Thr | His | Thr | Phe | Asn | Arg | Leu | Phe | Arg | Arg | Asp | Glu | Glu | Gly |  |  |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |  |  |
| Arg | Arg | Pro | Leu | Thr | Val | Val | Leu | Gln | Gly | Pro | Ala | Gly | Ile | Gly | Lys |  |  |
|     |     | 195 |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |  |  |
| Thr | Met | Ala | Ala | Lys | Lys | Ile | Leu | Tyr | Asp | Trp | Ala | Ala | Gly | Lys | Leu |  |  |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |  |  |
| Tyr | Gln | Gly | Gln | Val | Asp | Phe | Ala | Phe | Phe | Met | Pro | Cys | Gly | Glu | Leu |  |  |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |  |  |
| Leu | Glu | Arg | Pro | Gly | Thr | Arg | Ser | Leu | Ala | Asp | Leu | Ile | Leu | Asp | Gln |  |  |
|     |     |     |     | 245 |     |     |     |     | 250 |     |     |     |     | 255 |     |  |  |
| Cys | Pro | Asp | Arg | Gly | Ala | Pro | Val | Pro | Gln | Met | Leu | Ala | Gln | Pro | Gln |  |  |
|     |     |     | 260 |     |     |     |     | 265 |     |     |     |     | 270 |     |     |  |  |
| Arg | Leu | Leu | Phe | Ile | Leu | Asp | Gly | Ala | Asp | Glu | Leu | Pro | Ala | Leu | Gly |  |  |
|     | 275 |     |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |  |  |
| Gly | Pro | Glu | Ala | Ala | Pro | Cys | Thr | Asp | Pro | Phe | Glu | Ala | Ala | Ser | Gly |  |  |
|     | 290 |     |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |  |  |
| Ala | Arg | Val | Leu | Gly | Gly | Leu | Leu | Ser | Lys | Ala | Leu | Leu | Pro | Thr | Ala |  |  |
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |  |  |
| Leu | Leu | Leu | Val | Thr | Thr | Arg | Ala | Ala | Ala | Pro | Gly | Arg | Leu | Gln | Gly |  |  |
|     |     |     |     | 325 |     |     |     |     | 330 |     |     |     |     | 335 |     |  |  |
| Arg | Leu | Cys | Ser | Pro | Gln | Cys | Ala | Glu | Val | Arg | Gly | Phe | Ser | Asp | Lys |  |  |
|     |     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |  |  |
| Asp | Lys | Lys | Lys | Tyr | Phe | Tyr | Lys | Phe | Phe | Arg | Asp | Glu | Arg | Arg | Ala |  |  |
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| Glu | Arg | Ala | Tyr | Arg | Phe | Val | Lys | Glu | Asn | Glu | Thr | Leu | Phe | Ala | Leu |  |  |
|     | 370 |     |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |  |  |
| Cys | Phe | Val | Pro | Phe | Val | Cys | Trp | Ile | Val | Cys | Thr | Val | Leu | Arg | Gln |  |  |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |  |  |
| Gln | Leu | Glu | Leu | Gly | Arg | Asp | Leu | Ser | Arg | Thr | Ser | Lys | Thr | Thr | Thr |  |  |
|     |     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |  |  |
| Ser | Val | Tyr | Leu | Leu | Phe | Ile | Thr | Ser | Val | Leu | Ser | Ser | Ala | Pro | Val |  |  |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |  |  |
| Ala | Asp | Gly | Pro | Arg | Leu | Gln | Gly | Asp | Leu | Arg | Asn | Leu | Cys | Arg | Leu |  |  |
|     | 435 |     |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |  |  |
| Ala | Arg | Glu | Gly | Val | Leu | Gly | Arg | Arg | Ala | Gln | Phe | Ala | Glu | Lys | Glu |  |  |
|     | 450 |     |     |     |     | 455 |     |     |     | 460 |     |     |     |     |     |  |  |
| Leu | Glu | Gln | Leu | Glu | Leu | Arg | Gly | Ser | Lys | Val | Gln | Thr | Leu | Phe | Leu |  |  |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |  |  |
| Ser | Lys | Lys | Glu | Leu | Pro | Gly | Val | Leu | Glu | Thr | Glu | Val | Thr | Tyr | Gln |  |  |
|     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     | 495 |     |  |  |
| Phe | Ile | Asp | Gln | Ser | Phe | Gln | Glu | Phe | Leu | Ala | Ala | Leu | Ser | Tyr | Leu |  |  |
|     |     |     | 500 |     |     |     |     | 505 |     |     |     |     | 510 |     |     |  |  |
| Leu | Glu | Asp | Gly | Gly | Val | Pro | Arg | Thr | Ala | Ala | Gly | Gly | Val | Gly | Thr |  |  |
|     | 515 |     |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |  |  |
| Leu | Leu | Arg | Gly | Asp | Ala | Gln | Pro | His | Ser | His | Leu | Val | Leu | Thr | Thr |  |  |
|     | 530 |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |  |  |
| Arg | Phe | Leu | Phe | Gly | Leu | Leu | Ser | Ala | Glu | Arg | Met | Arg | Asp | Ile | Glu |  |  |
| 545 |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |  |  |
| Arg | His | Phe | Gly | Cys | Met | Val | Ser | Glu | Arg | Val | Lys | Gln | Glu | Ala | Leu |  |  |
|     |     |     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |  |  |
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| tcc tcc act cac agt tct cat att ccg ccc tgg aca ttc tct tgc tac | 96  |
| Ser Ser Thr His Ser Ser His Ile Pro Pro Trp Thr Phe Ser Cys Tyr |     |
| 20 25 30  |     |
| ccc ggc tcc cca tgt gaa aat ggg gtc atg ctg tac atg aga aac gtg | 144 |
| Pro Gly Ser Pro Cys Glu Asn Gly Val Met Leu Tyr Met Arg Asn Val |     |
| 35 40 45  |     |
| agc cat gag gag cta caa cgg ttc aag cag ctc tta ctg act gag ctc | 192 |
| Ser His Glu Glu Leu Gln Arg Phe Lys Gln Leu Leu Leu Thr Glu Leu |     |
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| Ser Thr Gly Thr Met Pro Ile Thr Trp Asp Gln Val Glu Thr Ala Ser |     |
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| Trp Ala Glu Val Val His Leu Leu Ile Glu Arg Phe Pro Gly Arg Arg |     |
| 85 90 95  |     |
| gct tgg gat gtg act tcg aac atc ttt gcc att atg aac tgt gat aaa | 336 |
| Ala Trp Asp Val Thr Ser Asn Ile Phe Ala Ile Met Asn Cys Asp Lys |     |
| 100 105 110   |     |
| atg tgt gtt gta gtc cgc aga gag ata aat gcc att ctg cct acc ttg | 384 |
| Met Cys Val Val Val Arg Arg Glu Ile Asn Ala Ile Leu Pro Thr Leu |     |
| 115 120 125   |     |
| gaa cca gag gac ttg aat gtg gga gaa aca cag gtg aat ctg gag gaa | 432 |
| Glu Pro Glu Asp Leu Asn Val Gly Glu Thr Gln Val Asn Leu Glu Glu |     |
| 130 135 140   |     |
| gga gaa tct ggt aaa ata cgg cgg tat aaa tcg aat gtg atg gaa aag | 480 |
| Gly Glu Ser Gly Lys Ile Arg Arg Tyr Lys Ser Asn Val Met Glu Lys |     |
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| Phe Phe Pro Ile Trp Asp Ile Thr Thr Trp Pro Gly Asn Gln Arg Asp |     |
| 165 170 175   |     |
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| Phe Phe Tyr Gln Gly Val His Arg His Glu Glu Tyr Leu Pro Cys Leu |     |
| 180 185 190   |     |

|   |      |
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| 195 200 205   |      |
| cag gga gct cct ggg atc gga aaa aca atc ctg gcc aaa aag gtg atg | 672  |
| Gln Gly Ala Pro Gly Ile Gly Lys Thr Ile Leu Ala Lys Lys Val Met |      |
| 210 215 220   |      |
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| Phe Glu Trp Ala Arg Asn Lys Phe Tyr Ala His Lys Arg Trp Cys Ala |      |
| 225 230 235 240   |      |
| ttc tac ttc cat tgc caa gag gtg aac cag acg aca gac cag agc ttc | 768  |
| Phe Tyr Phe His Cys Gln Glu Val Asn Gln Thr Thr Asp Gln Ser Phe |      |
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| Ser Glu Leu Ile Glu Gln Lys Trp Pro Gly Ser Gln Asp Leu Val Ser |      |
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| aag att atg tcc aaa ccc gac caa ctt ctg ctg ctc ttg gat ggc ttt | 864  |
| Lys Ile Met Ser Lys Pro Asp Gln Leu Leu Leu Leu Leu Asp Gly Phe |      |
| 275 280 285   |      |
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| Glu Glu Leu Thr Ser Thr Leu Ile Asp Arg Leu Glu Asp Leu Ser Glu |      |
| 290 295 300   |      |
| gac tgg agg cag aaa ttg cct ggg tct gtc cta ctg agc agt ttg ctg | 960  |
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| agc aaa acg atg ctt cca gag gcc acg cta ctg atc atg ata aga ttt | 1008 |
| Ser Lys Thr Met Leu Pro Glu Ala Thr Leu Leu Ile Met Ile Arg Phe |      |
| 325 330 335   |      |
| acc tct tgg cag aca tgc aag ccc ttg ctg aaa tgt ccc tct ctc gta | 1056 |
| Thr Ser Trp Gln Thr Cys Lys Pro Leu Leu Lys Cys Pro Ser Leu Val |      |
| 340 345 350   |      |
| acc ctt ccg ggg ttt aat acg atg gaa aaa atc aag tat ttc cag atg | 1104 |
| Thr Leu Pro Gly Phe Asn Thr Met Glu Lys Ile Lys Tyr Phe Gln Met |      |
| 355 360 365   |      |
| tat ttt gga cac aca gag gag gga gac caa gtc ttg agt ttc gcc atg | 1152 |
| Tyr Phe Gly His Thr Glu Glu Gly Asp Gln Val Leu Ser Phe Ala Met |      |
| 370 375 380   |      |
| gaa aac acc att ctc ttc tcc atg tgc cgg gtc cct gtg gtt tgc tgg | 1200 |
| Glu Asn Thr Ile Leu Phe Ser Met Cys Arg Val Pro Val Val Cys Trp |      |
| 385 390 395 400   |      |

|   |      |
|---|------|
| atg gtc tgc tct ggt ctg aaa cag caa atg gag aga gga aac aat ctc | 1248 |
| Met Val Cys Ser Gly Leu Lys Gln Gln Met Glu Arg Gly Asn Asn Leu |      |
| 405 410 415   |      |
| aca cag tca tgt cca aat gcc acc tct gtg ttc gtc cgg tat att tct | 1296 |
| Thr Gln Ser Cys Pro Asn Ala Thr Ser Val Phe Val Arg Tyr Ile Ser |      |
| 420 425 430   |      |
| agc ttg ttt ccc acc aga gct gag aac ttt tcc aga aag atc cac caa | 1344 |
| Ser Leu Phe Pro Thr Arg Ala Glu Asn Phe Ser Arg Lys Ile His Gln |      |
| 435 440 445   |      |
| gca caa ctg gaa ggt ctg tgt cac ttg gcc gca gac agc atg tgg cac | 1392 |
| Ala Gln Leu Glu Gly Leu Cys His Leu Ala Ala Asp Ser Met Trp His |      |
| 450 455 460   |      |
| agg aaa tgg gtg tta ggt aaa gaa gat ctt gag gaa gcc aag ctg gat | 1440 |
| Arg Lys Trp Val Leu Gly Lys Glu Asp Leu Glu Glu Ala Lys Leu Asp |      |
| 465 470 475 480   |      |
| cag acg gga gtc acc gcc ttc ctt ggc atg agt att ctt cgg aga att | 1488 |
| Gln Thr Gly Val Thr Ala Phe Leu Gly Met Ser Ile Leu Arg Arg Ile |      |
| 485 490 495   |      |
| gca ggt gag gaa gac cac tat gtc ttt acc ctc gtg act ttt cag gaa | 1536 |
| Ala Gly Glu Glu Asp His Tyr Val Phe Thr Leu Val Thr Phe Gln Glu |      |
| 500 505 510   |      |
| ttt ttt gcg gcc ttg ttt tat gtt ctc tgt ttc cca caa aga ctc aaa | 1584 |
| Phe Phe Ala Ala Leu Phe Tyr Val Leu Cys Phe Pro Gln Arg Leu Lys |      |
| 515 520 525   |      |
| aat ttt cat gtg ttg agc cac gtg aat atc cag cgc ctg ata gcg agt | 1632 |
| Asn Phe His Val Leu Ser His Val Asn Ile Gln Arg Leu Ile Ala Ser |      |
| 530 535 540   |      |
| ccc aga gga agc aaa agc tat ctc tct cac atg gga ctt ttc tta ttc | 1680 |
| Pro Arg Gly Ser Lys Ser Tyr Leu Ser His Met Gly Leu Phe Leu Phe |      |
| 545 550 555 560   |      |
| ggc ttt ctg aac gag gcc tgc gct tcg gcc gtg gaa cag tca ttc caa | 1728 |
| Gly Phe Leu Asn Glu Ala Cys Ala Ser Ala Val Glu Gln Ser Phe Gln |      |
| 565 570 575   |      |
| tgc aag gtg tct ttc ggt aat aag agg aaa ctg ctg aaa gtc ata cct | 1776 |
| Cys Lys Val Ser Phe Gly Asn Lys Arg Lys Leu Leu Lys Val Ile Pro |      |
| 580 585 590   |      |
| ctg ttg cat aaa tgt gac cca cct tct ccg ggc agt ggg gtc ccg cag | 1824 |
| Leu Leu His Lys Cys Asp Pro Pro Ser Pro Gly Ser Gly Val Pro Gln |      |
| 595 600 605   |      |
| tta ttc tac tgt ctg cat gaa atc cgg gag gaa gcc ttt gta agc caa | 1872 |

Leu Phe Tyr Cys Leu His Glu Ile Arg Glu Glu Ala Phe Val Ser Gln  
610 615 620

gcc cta aat gat tat cat aaa gtt gtc ttg aga att ggc aac aac aaa 1920  
Ala Leu Asn Asp Tyr His Lys Val Val Leu Arg Ile Gly Asn Asn Lys  
625 630 635 640

gaa gtt caa gtg tct gct ttt tgc ctg aag cgg tgt caa tat ttg cat 1968  
Glu Val Gln Val Ser Ala Phe Cys Leu Lys Arg Cys Gln Tyr Leu His  
645 650 655

gag gtg gaa ctg acc gtc acc ctg aac ttc atg aac gtg tgg aag ctc 2016  
Glu Val Glu Leu Thr Val Thr Leu Asn Phe Met Asn Val Trp Lys Leu  
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agc tcc agc tcc cat cct ggc tct gag taa 2046  
Ser Ser Ser Ser His Pro Gly Ser Glu  
675 680

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35 40 45  
Ser His Glu Glu Leu Gln Arg Phe Lys Gln Leu Leu Leu Thr Glu Leu  
50 55 60  
Ser Thr Gly Thr Met Pro Ile Thr Trp Asp Gln Val Glu Thr Ala Ser  
65 70 75 80  
Trp Ala Glu Val Val His Leu Leu Ile Glu Arg Phe Pro Gly Arg Arg  
85 90 95  
Ala Trp Asp Val Thr Ser Asn Ile Phe Ala Ile Met Asn Cys Asp Lys  
100 105 110  
Met Cys Val Val Val Arg Arg Glu Ile Asn Ala Ile Leu Pro Thr Leu  
115 120 125  
Glu Pro Glu Asp Leu Asn Val Gly Glu Thr Gln Val Asn Leu Glu Glu  
130 135 140  
Gly Glu Ser Gly Lys Ile Arg Arg Tyr Lys Ser Asn Val Met Glu Lys  
145 150 155 160  
Phe Phe Pro Ile Trp Asp Ile Thr Thr Trp Pro Gly Asn Gln Arg Asp  
165 170 175  
Phe Phe Tyr Gln Gly Val His Arg His Glu Glu Tyr Leu Pro Cys Leu  
180 185 190  
Leu Leu Pro Lys Arg Pro Gln Gly Arg Gln Pro Lys Thr Val Ala Ile  
195 200 205  
Gln Gly Ala Pro Gly Ile Gly Lys Thr Ile Leu Ala Lys Lys Val Met



|   |     |     |
|---|-----|-----|
| 210   | 215 | 220 |
| Phe Glu Trp Ala Arg Asn Lys Phe Tyr Ala His Lys Arg Trp Cys Ala |     |     |
| 225   | 230 | 235 |
| Phe Tyr Phe His Cys Gln Glu Val Asn Gln Thr Thr Asp Gln Ser Phe |     | 240 |
|   | 245 | 250 |
| Ser Glu Leu Ile Glu Gln Lys Trp Pro Gly Ser Gln Asp Leu Val Ser |     | 255 |
|   | 260 | 265 |
| Lys Ile Met Ser Lys Pro Asp Gln Leu Leu Leu Leu Leu Asp Gly Phe |     | 270 |
|   | 275 | 280 |
| Glu Glu Leu Thr Ser Thr Leu Ile Asp Arg Leu Glu Asp Leu Ser Glu |     | 285 |
|   | 290 | 295 |
| Asp Trp Arg Gln Lys Leu Pro Gly Ser Val Leu Leu Ser Ser Leu Leu |     | 300 |
| 305   | 310 | 315 |
| Ser Lys Thr Met Leu Pro Glu Ala Thr Leu Leu Ile Met Ile Arg Phe |     | 320 |
|   | 325 | 330 |
| Thr Ser Trp Gln Thr Cys Lys Pro Leu Leu Lys Cys Pro Ser Leu Val |     | 335 |
|   | 340 | 345 |
| Thr Leu Pro Gly Phe Asn Thr Met Glu Lys Ile Lys Tyr Phe Gln Met |     | 350 |
|   | 355 | 360 |
| Tyr Phe Gly His Thr Glu Glu Gly Asp Gln Val Leu Ser Phe Ala Met |     | 365 |
|   | 370 | 375 |
| Glu Asn Thr Ile Leu Phe Ser Met Cys Arg Val Pro Val Val Cys Trp |     | 380 |
| 385   | 390 | 395 |
| Met Val Cys Ser Gly Leu Lys Gln Gln Met Glu Arg Gly Asn Asn Leu |     | 400 |
|   | 405 | 410 |
| Thr Gln Ser Cys Pro Asn Ala Thr Ser Val Phe Val Arg Tyr Ile Ser |     | 415 |
|   | 420 | 425 |
| Ser Leu Phe Pro Thr Arg Ala Glu Asn Phe Ser Arg Lys Ile His Gln |     | 430 |
|   | 435 | 440 |
| Ala Gln Leu Glu Gly Leu Cys His Leu Ala Ala Asp Ser Met Trp His |     | 445 |
|   | 450 | 455 |
| Arg Lys Trp Val Leu Gly Lys Glu Asp Leu Glu Glu Ala Lys Leu Asp |     | 460 |
| 465   | 470 | 475 |
| Gln Thr Gly Val Thr Ala Phe Leu Gly Met Ser Ile Leu Arg Arg Ile |     | 480 |
|   | 485 | 490 |
| Ala Gly Glu Glu Asp His Tyr Val Phe Thr Leu Val Thr Phe Gln Glu |     | 495 |
|   | 500 | 505 |
| Phe Phe Ala Ala Leu Phe Tyr Val Leu Cys Phe Pro Gln Arg Leu Lys |     | 510 |
|   | 515 | 520 |
| Asn Phe His Val Leu Ser His Val Asn Ile Gln Arg Leu Ile Ala Ser |     | 525 |
|   | 530 | 535 |
| Pro Arg Gly Ser Lys Ser Tyr Leu Ser His Met Gly Leu Phe Leu Phe |     | 540 |
| 545   | 550 | 555 |
| Gly Phe Leu Asn Glu Ala Cys Ala Ser Ala Val Glu Gln Ser Phe Gln |     | 560 |
|   | 565 | 570 |
| Cys Lys Val Ser Phe Gly Asn Lys Arg Lys Leu Leu Lys Val Ile Pro |     | 575 |
|   | 580 | 585 |
| Leu Leu His Lys Cys Asp Pro Pro Ser Pro Gly Ser Gly Val Pro Gln |     | 590 |
|   | 595 | 600 |
| Leu Phe Tyr Cys Leu His Glu Ile Arg Glu Glu Ala Phe Val Ser Gln |     | 605 |
|   | 610 | 615 |
| Ala Leu Asn Asp Tyr His Lys Val Val Leu Arg Ile Gly Asn Asn Lys |     | 620 |
| 625   | 630 | 635 |
|   |     | 640 |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Glu | Val | Gln | Val | Ser | Ala | Phe | Cys | Leu | Lys | Arg | Cys | Gln | Tyr | Leu | His |
|     |     |     |     | 645 |     |     |     |     | 650 |     |     |     |     | 655 |     |
| Glu | Val | Glu | Leu | Thr | Val | Thr | Leu | Asn | Phe | Met | Asn | Val | Trp | Lys | Leu |
|     |     |     | 660 |     |     |     |     | 665 |     |     |     |     | 670 |     |     |
| Ser | Ser | Ser | Ser | His | Pro | Gly | Ser | Glu |     |     |     |     |     |     |     |
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| Met Ala Met Ala Lys Ala Arg Lys Pro Arg Glu Ala Leu Leu Trp Ala |     |
| 1 5 10 15   |     |
| ttg agt gac ctt gag gag aac gat ttc aag aag tta aag ttc tac tta | 96  |
| Leu Ser Asp Leu Glu Glu Asn Asp Phe Lys Lys Leu Lys Phe Tyr Leu |     |
| 20 25 30  |     |
| cgg gat atg acc ctg tct gag ggc cag ccc cca ctg gcc aga ggg gag | 144 |
| Arg Asp Met Thr Leu Ser Glu Gly Gln Pro Pro Leu Ala Arg Gly Glu |     |
| 35 40 45  |     |
| ttg gag ggc ctg att ccg gtg gac ctg gca gaa tta ctg att tca aag | 192 |
| Leu Glu Gly Leu Ile Pro Val Asp Leu Ala Glu Leu Leu Ile Ser Lys |     |
| 50 55 60  |     |
| tat gga gaa aag gag gct gtg aaa gtt gtc ctc aag ggc ttg aag gtc | 240 |
| Tyr Gly Glu Lys Glu Ala Val Lys Val Val Leu Lys Gly Leu Lys Val |     |
| 65 70 75 80   |     |
| atg aac ctg ttg gaa ctt gtg gac cag ctc agc cat att tgt ctg cat | 288 |
| Met Asn Leu Leu Glu Leu Val Asp Gln Leu Ser His Ile Cys Leu His |     |
| 85 90 95  |     |
| ggg gtc ggc tgg cac tgg aaa gac aac tct cgc cag aaa aag gtg ttg | 336 |
| Gly Val Gly Trp His Trp Lys Asp Asn Ser Arg Gln Lys Lys Val Leu |     |
| 100 105 110   |     |
| gac tgg gcc acc ggt act ctg tac cca ggc cgg ttt gat tat gtc ttt | 384 |
| Asp Trp Ala Thr Gly Thr Leu Tyr Pro Gly Arg Phe Asp Tyr Val Phe |     |
| 115 120 125   |     |
| tat gta agc tgc aaa gaa gtg gtc ctg ctg ctg gag agc aaa ctg gag | 432 |
| Tyr Val Ser Cys Lys Glu Val Val Leu Leu Leu Glu Ser Lys Leu Glu |     |
| 130 135 140   |     |

|   |      |
|---|------|
| cag ctc ctt ttc tgg tgc tgc ggg gac aat caa gcc cct gtc aca gag | 480  |
| Gln Leu Leu Phe Trp Cys Cys Gly Asp Asn Gln Ala Pro Val Thr Glu |      |
| 145 150 155 160   |      |
| att ctg agg cag cca gag cgg ctc ctg ttc atc ctg gat ggc ttt gat | 528  |
| Ile Leu Arg Gln Pro Glu Arg Leu Leu Phe Ile Leu Asp Gly Phe Asp |      |
| 165 170 175   |      |
| gag ctg cag agg ccc ttt gaa gaa aag ttg aag aag agg ggt ttg agt | 576  |
| Glu Leu Gln Arg Pro Phe Glu Glu Lys Leu Lys Lys Arg Gly Leu Ser |      |
| 180 185 190   |      |
| ccc aag gag agc ctg ctg cac ctt cta att agg aga cat aca ctc ccc | 624  |
| Pro Lys Glu Ser Leu Leu His Leu Leu Ile Arg Arg His Thr Leu Pro |      |
| 195 200 205   |      |
| acg tgc tcc ctt ctc atc acc acc cgg ccc ctg gct ttg agg aat ctg | 672  |
| Thr Cys Ser Leu Leu Ile Thr Thr Arg Pro Leu Ala Leu Arg Asn Leu |      |
| 210 215 220   |      |
| gag ccc ttg ctg aaa caa gca cgt cat gtc cat atc cta ggc ttc tct | 720  |
| Glu Pro Leu Leu Lys Gln Ala Arg His Val His Ile Leu Gly Phe Ser |      |
| 225 230 235 240   |      |
| gag gag gag agg gcg agg tac ttc agc tcc tat ttc acg gat gag aag | 768  |
| Glu Glu Glu Arg Ala Arg Tyr Phe Ser Ser Tyr Phe Thr Asp Glu Lys |      |
| 245 250 255   |      |
| caa gct gac cgt gcc ttc gac att gta cag aaa aat gac att ctc tac | 816  |
| Gln Ala Asp Arg Ala Phe Asp Ile Val Gln Lys Asn Asp Ile Leu Tyr |      |
| 260 265 270   |      |
| aaa gcg tgt cag gtt cca ggc att tgc tgg gtg gtc tgc tcc tgg ctg | 864  |
| Lys Ala Cys Gln Val Pro Gly Ile Cys Trp Val Val Cys Ser Trp Leu |      |
| 275 280 285   |      |
| cag ggg cag atg gag aga ggc aaa gtt gtc tta gag aca cct aga aac | 912  |
| Gln Gly Gln Met Glu Arg Gly Lys Val Val Leu Glu Thr Pro Arg Asn |      |
| 290 295 300   |      |
| agc act gac atc ttc atg gct tac gtc tcc acc ttt ctg ccg ccc gat | 960  |
| Ser Thr Asp Ile Phe Met Ala Tyr Val Ser Thr Phe Leu Pro Pro Asp |      |
| 305 310 315 320   |      |
| gat gat ggg ggc tgc tcc gag ctt tcc cgg cac agg gtc ctg agg agt | 1008 |
| Asp Asp Gly Gly Cys Ser Glu Leu Ser Arg His Arg Val Leu Arg Ser |      |
| 325 330 335   |      |
| ctg tgc tcc cta gca gct gaa ggg att cag cac cag agg ttc cta ttt | 1056 |
| Leu Cys Ser Leu Ala Ala Glu Gly Ile Gln His Gln Arg Phe Leu Phe |      |
| 340 345 350   |      |

gaa gaa gct gag ctc agg aaa cat aat tta gat ggc ccc agg ctt gcc 1104  
 Glu Glu Ala Glu Leu Arg Lys His Asn Leu Asp Gly Pro Arg Leu Ala  
 355 360 365

gct ttc ctg agt agt aac gac tac caa ttg gga ctt gcc atc aag aag 1152  
 Ala Phe Leu Ser Ser Asn Asp Tyr Gln Leu Gly Leu Ala Ile Lys Lys  
 370 375 380

ttc tac agc ttc cgc cac atc agc ttc cag gac ttt ttt cat gcc atg 1200  
 Phe Tyr Ser Phe Arg His Ile Ser Phe Gln Asp Phe Phe His Ala Met  
 385 390 395 400

tct tac ctg gtg aaa gag gac caa agc cgg ctg ggg aag gag tcc cgc 1248  
 Ser Tyr Leu Val Lys Glu Asp Gln Ser Arg Leu Gly Lys Glu Ser Arg  
 405 410 415

aga gaa gtg caa agg ctg ctg gag gta aag gag cag gaa ggg aat gat 1296  
 Arg Glu Val Gln Arg Leu Leu Glu Val Lys Glu Gln Glu Gly Asn Asp  
 420 425 430

gag atg acc ctc act atg cag ttt tta ctg gac atc tcg aaa aaa gac 1344  
 Glu Met Thr Leu Thr Met Gln Phe Leu Leu Asp Ile Ser Lys Lys Asp  
 435 440 445

agc ttc tcg aac ttg gag ctc aag ttc tgc ttc aga att tct ccc tgt 1392  
 Ser Phe Ser Asn Leu Glu Leu Lys Phe Cys Phe Arg Ile Ser Pro Cys  
 450 455 460

tta gcg cag gat ctg aag cat ttt aaa gaa cag atg gaa tct atg aag 1440  
 Leu Ala Gln Asp Leu Lys His Phe Lys Glu Gln Met Glu Ser Met Lys  
 465 470 475 480

cac aac agg acc tgg gat ttg gaa ttc tcc ctg tat gaa gct aaa ata 1488  
 His Asn Arg Thr Trp Asp Leu Glu Phe Ser Leu Tyr Glu Ala Lys Ile  
 485 490 495

aag aat ctg gta aaa gta ttc aga tga 1515  
 Lys Asn Leu Val Lys Val Phe Arg  
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 Arg Asp Met Thr Leu Ser Glu Gly Gln Pro Pro Leu Ala Arg Gly Glu  
 35 40 45

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Leu | Glu | Gly | Leu | Ile | Pro | Val | Asp | Leu | Ala | Glu | Leu | Leu | Ile | Ser | Lys |
| 50  |     |     |     |     |     | 55  |     |     |     | 60  |     |     |     |     |     |
| Tyr | Gly | Glu | Lys | Glu | Ala | Val | Lys | Val | Val | Leu | Lys | Gly | Leu | Lys | Val |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     | 80  |
| Met | Asn | Leu | Leu | Glu | Leu | Val | Asp | Gln | Leu | Ser | His | Ile | Cys | Leu | His |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |
| Gly | Val | Gly | Trp | His | Trp | Lys | Asp | Asn | Ser | Arg | Gln | Lys | Lys | Val | Leu |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Asp | Trp | Ala | Thr | Gly | Thr | Leu | Tyr | Pro | Gly | Arg | Phe | Asp | Tyr | Val | Phe |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Tyr | Val | Ser | Cys | Lys | Glu | Val | Val | Leu | Leu | Leu | Glu | Ser | Lys | Leu | Glu |
|     |     | 130 |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |
| Gln | Leu | Leu | Phe | Trp | Cys | Cys | Gly | Asp | Asn | Gln | Ala | Pro | Val | Thr | Glu |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |
| Ile | Leu | Arg | Gln | Pro | Glu | Arg | Leu | Leu | Phe | Ile | Leu | Asp | Gly | Phe | Asp |
|     |     |     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |
| Glu | Leu | Gln | Arg | Pro | Phe | Glu | Glu | Lys | Leu | Lys | Lys | Arg | Gly | Leu | Ser |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |
| Pro | Lys | Glu | Ser | Leu | Leu | His | Leu | Leu | Ile | Arg | Arg | His | Thr | Leu | Pro |
|     |     | 195 |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |
| Thr | Cys | Ser | Leu | Leu | Ile | Thr | Thr | Arg | Pro | Leu | Ala | Leu | Arg | Asn | Leu |
|     |     | 210 |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |
| Glu | Pro | Leu | Leu | Lys | Gln | Ala | Arg | His | Val | His | Ile | Leu | Gly | Phe | Ser |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |
| Glu | Glu | Glu | Arg | Ala | Arg | Tyr | Phe | Ser | Ser | Tyr | Phe | Thr | Asp | Glu | Lys |
|     |     |     |     | 245 |     |     |     |     | 250 |     |     |     |     | 255 |     |
| Gln | Ala | Asp | Arg | Ala | Phe | Asp | Ile | Val | Gln | Lys | Asn | Asp | Ile | Leu | Tyr |
|     |     |     | 260 |     |     |     |     | 265 |     |     |     |     | 270 |     |     |
| Lys | Ala | Cys | Gln | Val | Pro | Gly | Ile | Cys | Trp | Val | Val | Cys | Ser | Trp | Leu |
|     |     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |
| Gln | Gly | Gln | Met | Glu | Arg | Gly | Lys | Val | Val | Leu | Glu | Thr | Pro | Arg | Asn |
|     |     | 290 |     |     |     | 295 |     |     |     | 300 |     |     |     |     |     |
| Ser | Thr | Asp | Ile | Phe | Met | Ala | Tyr | Val | Ser | Thr | Phe | Leu | Pro | Pro | Asp |
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |
| Asp | Asp | Gly | Gly | Cys | Ser | Glu | Leu | Ser | Arg | His | Arg | Val | Leu | Arg | Ser |
|     |     |     |     | 325 |     |     |     |     | 330 |     |     |     | 335 |     |     |
| Leu | Cys | Ser | Leu | Ala | Ala | Glu | Gly | Ile | Gln | His | Gln | Arg | Phe | Leu | Phe |
|     |     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |
| Glu | Glu | Ala | Glu | Leu | Arg | Lys | His | Asn | Leu | Asp | Gly | Pro | Arg | Leu | Ala |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |
| Ala | Phe | Leu | Ser | Ser | Asn | Asp | Tyr | Gln | Leu | Gly | Leu | Ala | Ile | Lys | Lys |
|     |     | 370 |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |
| Phe | Tyr | Ser | Phe | Arg | His | Ile | Ser | Phe | Gln | Asp | Phe | Phe | His | Ala | Met |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |
| Ser | Tyr | Leu | Val | Lys | Glu | Asp | Gln | Ser | Arg | Leu | Gly | Lys | Glu | Ser | Arg |
|     |     |     |     | 405 |     |     |     |     | 410 |     |     |     | 415 |     |     |
| Arg | Glu | Val | Gln | Arg | Leu | Leu | Glu | Val | Lys | Glu | Gln | Glu | Gly | Asn | Asp |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |
| Glu | Met | Thr | Leu | Thr | Met | Gln | Phe | Leu | Leu | Asp | Ile | Ser | Lys | Lys | Asp |
|     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |
| Ser | Phe | Ser | Asn | Leu | Glu | Leu | Lys | Phe | Cys | Phe | Arg | Ile | Ser | Pro | Cys |
|     |     | 450 |     |     |     | 455 |     |     |     | 460 |     |     |     |     |     |
| Leu | Ala | Gln | Asp | Leu | Lys | His | Phe | Lys | Glu | Gln | Met | Glu | Ser | Met | Lys |

465                      470                      475                      480  
His Asn Arg Thr Trp Asp Leu Glu Phe Ser Leu Tyr Glu Ala Lys Ile  
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Lys Asn Leu Val Lys Val Phe Arg  
                         500

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<212> DNA  
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ttg gaa gaa ctc gag gct gtg gaa ctg aag aag ttc aag tta tac ctg      96  
Leu Glu Glu Leu Glu Ala Val Glu Leu Lys Lys Phe Lys Leu Tyr Leu  
                         20                      25                      30  
  
ggg acc gcg aca gag ctg gga gaa ggc aag atc ccc tgg gga agc atg      144  
Gly Thr Ala Thr Glu Leu Gly Glu Gly Lys Ile Pro Trp Gly Ser Met  
                         35                      40                      45  
  
gag aag gcc ggt ccc ctg gaa atg gcc cag ctg ctc atc acc cac ttc      192  
Glu Lys Ala Gly Pro Leu Glu Met Ala Gln Leu Leu Ile Thr His Phe  
                         50                      55                      60  
  
ggg cca gag gag gcc tgg agg ttg gct ctc agc acc ttt gag cgg ata      240  
Gly Pro Glu Glu Ala Trp Arg Leu Ala Leu Ser Thr Phe Glu Arg Ile  
65                      70                      75                      80  
  
aac agg aag gac ctg tgg gag aga gga cag aga gag gac ctg gtg agg      288  
Asn Arg Lys Asp Leu Trp Glu Arg Gly Gln Arg Glu Asp Leu Val Arg  
                         85                      90                      95  
  
gat ccc cag gaa acc tac agg gac tat gtc cgc agg aaa ttc cgg ctc      336  
Asp Pro Gln Glu Thr Tyr Arg Asp Tyr Val Arg Arg Lys Phe Arg Leu  
                         100                      105                      110  
  
atg gaa gac cgc aat gcg cgc cta ggg gaa tgt gtc aac ctc agc cac      384  
Met Glu Asp Arg Asn Ala Arg Leu Gly Glu Cys Val Asn Leu Ser His  
                         115                      120                      125  
  
cgg tac acc cgg ctc ctg ctg gtg aag gag cac tca aac ccc atg cag      432  
Arg Tyr Thr Arg Leu Leu Leu Val Lys Glu His Ser Asn Pro Met Gln  
130                      135                      140

|   |      |
|---|------|
| gtc cag cag cag ctt ctg gac aca ggc cgg gga cac gcg agg acc gtg | 480  |
| Val Gln Gln Gln Leu Leu Asp Thr Gly Arg Gly His Ala Arg Thr Val |      |
| 145 150 155 160   |      |
| gga cac cag gct agc ccc atc aag ata gag acc ctc ttt gag cca gac | 528  |
| Gly His Gln Ala Ser Pro Ile Lys Ile Glu Thr Leu Phe Glu Pro Asp |      |
| 165 170 175   |      |
| gag gag cgc ccc gag cca ccg cgc acc gtg gtc atg caa ggc gcg gca | 576  |
| Glu Glu Arg Pro Glu Pro Pro Arg Thr Val Val Met Gln Gly Ala Ala |      |
| 180 185 190   |      |
| ggg ata ggc aag tcc atg ctg gca cac aag gtg atg ctg gac tgg gcg | 624  |
| Gly Ile Gly Lys Ser Met Leu Ala His Lys Val Met Leu Asp Trp Ala |      |
| 195 200 205   |      |
| gac ggg aag ctc ttc caa ggc aga ttt gat tat ctc ttc tac atc aac | 672  |
| Asp Gly Lys Leu Phe Gln Gly Arg Phe Asp Tyr Leu Phe Tyr Ile Asn |      |
| 210 215 220   |      |
| tgc agg gag atg aac cag agt gcc acg gaa tgc agc atg caa gac ctc | 720  |
| Cys Arg Glu Met Asn Gln Ser Ala Thr Glu Cys Ser Met Gln Asp Leu |      |
| 225 230 235 240   |      |
| atc ttc agc tgc tgg cct gag ccc agc gcg cct ctc cag gag ctc atc | 768  |
| Ile Phe Ser Cys Trp Pro Glu Pro Ser Ala Pro Leu Gln Glu Leu Ile |      |
| 245 250 255   |      |
| cga gtt ccc gag cgc ctc ctt ttc atc atc gac ggc ttc gat gag ctc | 816  |
| Arg Val Pro Glu Arg Leu Leu Phe Ile Ile Asp Gly Phe Asp Glu Leu |      |
| 260 265 270   |      |
| aag cct tct ttc cac gat cct cag gga ccc tgg tgc ctc tgc tgg gag | 864  |
| Lys Pro Ser Phe His Asp Pro Gln Gly Pro Trp Cys Leu Cys Trp Glu |      |
| 275 280 285   |      |
| gag aaa cgg ccc acg gag ctg ctt ctt aac agc tta att cgg aag aag | 912  |
| Glu Lys Arg Pro Thr Glu Leu Leu Leu Asn Ser Leu Ile Arg Lys Lys |      |
| 290 295 300   |      |
| ctg ctc cct gag cta tct ttg ctc atc acc aca cgg ccc acg gct ttg | 960  |
| Leu Leu Pro Glu Leu Ser Leu Leu Ile Thr Thr Arg Pro Thr Ala Leu |      |
| 305 310 315 320   |      |
| gag aag ctc cac cgt ctg ctg gag cac ccc agg cat gtg gag atc ctg | 1008 |
| Glu Lys Leu His Arg Leu Leu Glu His Pro Arg His Val Glu Ile Leu |      |
| 325 330 335   |      |
| ggc ttc tct gag gca gaa agg aag gaa tac ttc tac aag tat ttc cac | 1056 |
| Gly Phe Ser Glu Ala Glu Arg Lys Glu Tyr Phe Tyr Lys Tyr Phe His |      |
| 340 345 350   |      |
| aat gca gag cag gcg ggc caa gtc ttc aat tac gtg agg gac aac gag | 1104 |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|--|
| Asn | Ala | Glu | Gln | Ala | Gly | Gln | Val | Phe | Asn | Tyr | Val | Arg | Asp | Asn | Glu |      |  |
|     | 355 |     |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |      |  |
| cct | ctc | ttc | acc | atg | tgc | ttc | gtc | ccc | ctg | gtg | tgc | tgg | gtg | gtg | tgt | 1152 |  |
| Pro | Leu | Phe | Thr | Met | Cys | Phe | Val | Pro | Leu | Val | Cys | Trp | Val | Val | Cys |      |  |
|     | 370 |     |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |      |  |
| acc | tgc | ctc | cag | cag | cag | ctg | gag | ggg | ggg | ggg | ctg | ttg | aga | cag | acg | 1200 |  |
| Thr | Cys | Leu | Gln | Gln | Gln | Leu | Glu | Gly | Gly | Gly | Leu | Leu | Arg | Gln | Thr |      |  |
|     | 385 |     |     |     |     | 390 |     |     |     | 395 |     |     |     |     | 400 |      |  |
| tcc | agg | acc | acc | act | gca | gtg | tac | atg | ctc | tac | ctg | ctg | agt | ctg | atg | 1248 |  |
| Ser | Arg | Thr | Thr | Thr | Ala | Val | Tyr | Met | Leu | Tyr | Leu | Leu | Ser | Leu | Met |      |  |
|     |     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |      |  |
| caa | ccc | aag | ccg | ggg | gcc | ccg | cgc | ctc | cag | ccc | cca | ccc | aac | cag | aga | 1296 |  |
| Gln | Pro | Lys | Pro | Gly | Ala | Pro | Arg | Leu | Gln | Pro | Pro | Pro | Asn | Gln | Arg |      |  |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |      |  |
| ggg | ttg | tgc | tcc | ttg | gcg | gca | gat | ggg | ctc | tgg | aat | cag | aaa | atc | cta | 1344 |  |
| Gly | Leu | Cys | Ser | Leu | Ala | Ala | Asp | Gly | Leu | Trp | Asn | Gln | Lys | Ile | Leu |      |  |
|     | 435 |     |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |      |  |
| ttt | gag | gag | cag | gac | ctc | cgg | aag | cac | ggc | cta | gac | ggg | gaa | gac | gtc | 1392 |  |
| Phe | Glu | Glu | Gln | Asp | Leu | Arg | Lys | His | Gly | Leu | Asp | Gly | Glu | Asp | Val |      |  |
|     | 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |      |  |
| tct | gcc | ttc | ctc | aac | atg | aac | atc | ttc | cag | aag | gac | atc | aac | tgt | gag | 1440 |  |
| Ser | Ala | Phe | Leu | Asn | Met | Asn | Ile | Phe | Gln | Lys | Asp | Ile | Asn | Cys | Glu |      |  |
|     | 465 |     |     |     |     | 470 |     |     |     | 475 |     |     |     |     | 480 |      |  |
| agg | tac | tac | agc | ttc | atc | cac | ttg | agt | ttc | cag | gaa | ttc | ttt | gca | gct | 1488 |  |
| Arg | Tyr | Tyr | Ser | Phe | Ile | His | Leu | Ser | Phe | Gln | Glu | Phe | Phe | Ala | Ala |      |  |
|     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     | 495 |     |      |  |
| atg | tac | tat | atc | ctg | gac | gag | ggg | gag | ggc | ggg | gca | ggc | cca | gac | cag | 1536 |  |
| Met | Tyr | Tyr | Ile | Leu | Asp | Glu | Gly | Glu | Gly | Gly | Ala | Gly | Pro | Asp | Gln |      |  |
|     |     |     | 500 |     |     |     |     | 505 |     |     |     |     | 510 |     |     |      |  |
| gac | gtg | acc | agg | ctg | ttg | acc | gag | tac | gcg | ttt | tct | gaa | agg | agc | ttc | 1584 |  |
| Asp | Val | Thr | Arg | Leu | Leu | Thr | Glu | Tyr | Ala | Phe | Ser | Glu | Arg | Ser | Phe |      |  |
|     |     | 515 |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |      |  |
| ctg | gca | ctc | acc | agc | cgc | ttc | ctg | ttt | gga | ctc | ctg | aac | gag | gag | acc | 1632 |  |
| Leu | Ala | Leu | Thr | Ser | Arg | Phe | Leu | Phe | Gly | Leu | Leu | Asn | Glu | Glu | Thr |      |  |
|     | 530 |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |      |  |
| agg | agc | cac | ctg | gag | aag | agt | ctc | tgc | tgg | aag | gtc | tcg | ccg | cac | atc | 1680 |  |
| Arg | Ser | His | Leu | Glu | Lys | Ser | Leu | Cys | Trp | Lys | Val | Ser | Pro | His | Ile |      |  |
|     | 545 |     |     |     | 550 |     |     |     | 555 |     |     |     |     |     | 560 |      |  |
| aag | atg | gac | ctg | ttg | cag | tgg | atc | caa | agc | aaa | gct | cag | agc | gac | ggc | 1728 |  |
| Lys | Met | Asp | Leu | Leu | Gln | Trp | Ile | Gln | Ser | Lys | Ala | Gln | Ser | Asp | Gly |      |  |



| 565   | 570 | 575 |      |
|---|-----|-----|------|
| tcc acc ctg cag cag ggc tcc ttg gag ttc ttc agc tgc ttg tac gag |     |     | 1776 |
| Ser Thr Leu Gln Gln Gly Ser Leu Glu Phe Phe Ser Cys Leu Tyr Glu |     |     |      |
| 580   | 585 | 590 |      |
| atc cag gag gag gag ttt atc cag cag gcc ctg agc cac ttc cag gtg |     |     | 1824 |
| Ile Gln Glu Glu Glu Phe Ile Gln Gln Ala Leu Ser His Phe Gln Val |     |     |      |
| 595   | 600 | 605 |      |
| atc gtg gtc agc aac att gcc tcc aag atg gag cac atg gtc tcc tcg |     |     | 1872 |
| Ile Val Val Ser Asn Ile Ala Ser Lys Met Glu His Met Val Ser Ser |     |     |      |
| 610   | 615 | 620 |      |
| ttc tgt ctg aag cgc tgc agg agc gcc cag gtg ctg cac ttg tat ggc |     |     | 1920 |
| Phe Cys Leu Lys Arg Cys Arg Ser Ala Gln Val Leu His Leu Tyr Gly |     |     |      |
| 625   | 630 | 635 | 640  |
| gcc acc tac agc gcg gac ggg gaa gac cgc gcg agg tgc tcc gca gga |     |     | 1968 |
| Ala Thr Tyr Ser Ala Asp Gly Glu Asp Arg Ala Arg Cys Ser Ala Gly |     |     |      |
| 645   | 650 | 655 |      |
| gcg cac acg ctg ttg gtg cag ctc aga cca gag agg acc gtt ctg ctg |     |     | 2016 |
| Ala His Thr Leu Leu Val Gln Leu Arg Pro Glu Arg Thr Val Leu Leu |     |     |      |
| 660   | 665 | 670 |      |
| gac gcc tac agt gaa cat ctg gca gcg gcc ctg tgc acc aat cca aac |     |     | 2064 |
| Asp Ala Tyr Ser Glu His Leu Ala Ala Ala Leu Cys Thr Asn Pro Asn |     |     |      |
| 675   | 680 | 685 |      |
| ctg ata gag ctg tct ctg tac cga aat gcc ctg ggc agc cgg ggg gtg |     |     | 2112 |
| Leu Ile Glu Leu Ser Leu Tyr Arg Asn Ala Leu Gly Ser Arg Gly Val |     |     |      |
| 690   | 695 | 700 |      |
| aag ctg ctc tgt caa gga ctc aga cac ccc aac tgc aaa ctt cag aac |     |     | 2160 |
| Lys Leu Leu Cys Gln Gly Leu Arg His Pro Asn Cys Lys Leu Gln Asn |     |     |      |
| 705   | 710 | 715 | 720  |
| ctg agg ctg aag agg tgc cgc atc tcc agc tca gcc tgc gag gac ctc |     |     | 2208 |
| Leu Arg Leu Lys Arg Cys Arg Ile Ser Ser Ser Ala Cys Glu Asp Leu |     |     |      |
| 725   | 730 | 735 |      |
| tct gca gct ctc ata gcc aat aag aat ttg aca agg atg gat ctc agt |     |     | 2256 |
| Ser Ala Ala Leu Ile Ala Asn Lys Asn Leu Thr Arg Met Asp Leu Ser |     |     |      |
| 740   | 745 | 750 |      |
| ggc aac ggc gtt gga ttc cca ggc atg atg ctg ctt tgc gag ggc ctg |     |     | 2304 |
| Gly Asn Gly Val Gly Phe Pro Gly Met Met Leu Leu Cys Glu Gly Leu |     |     |      |
| 755   | 760 | 765 |      |
| cgg cat ccc cag tgc agg ctg cag atg att cag ttg agg aag tgt cag |     |     | 2352 |
| Arg His Pro Gln Cys Arg Leu Gln Met Ile Gln Leu Arg Lys Cys Gln |     |     |      |
| 770   | 775 | 780 |      |

|   |      |
|---|------|
| ctg gag tcc ggg gct tgt cag gag atg gct tct gtg ctc ggc acc aac | 2400 |
| Leu Glu Ser Gly Ala Cys Gln Glu Met Ala Ser Val Leu Gly Thr Asn |      |
| 785 790 795 800   |      |
| cca cat ctg gtt gag ttg gac ctg aca gga aat gca ctg gag gat ttg | 2448 |
| Pro His Leu Val Glu Leu Asp Leu Thr Gly Asn Ala Leu Glu Asp Leu |      |
| 805 810 815   |      |
| ggc ctg agg tta cta tgc cag gga ctg agg cac cca gtc tgc aga cta | 2496 |
| Gly Leu Arg Leu Leu Cys Gln Gly Leu Arg His Pro Val Cys Arg Leu |      |
| 820 825 830   |      |
| cgg act ttg tgg ctg aag atc tgc cgc ctc act gct gct gcc tgt gac | 2544 |
| Arg Thr Leu Trp Leu Lys Ile Cys Arg Leu Thr Ala Ala Ala Cys Asp |      |
| 835 840 845   |      |
| gag ctg gcc tca act ctc agt gtg aac cag agc ctg aga gag ctg gac | 2592 |
| Glu Leu Ala Ser Thr Leu Ser Val Asn Gln Ser Leu Arg Glu Leu Asp |      |
| 850 855 860   |      |
| ctg agc ctg aat gag ctg ggg gac ctc ggg gtg ctg ctg ctg tgt gag | 2640 |
| Leu Ser Leu Asn Glu Leu Gly Asp Leu Gly Val Leu Leu Leu Cys Glu |      |
| 865 870 875 880   |      |
| ggc ctc agg cat ccc acg tgc aag ctc cag acc ctg cgg ttg ggc atc | 2688 |
| Gly Leu Arg His Pro Thr Cys Lys Leu Gln Thr Leu Arg Leu Gly Ile |      |
| 885 890 895   |      |
| tgc cgg ctg ggc tct gcc gcc tgt gag ggt ctt tct gtg gtg ctc cag | 2736 |
| Cys Arg Leu Gly Ser Ala Ala Cys Glu Gly Leu Ser Val Val Leu Gln |      |
| 900 905 910   |      |
| gcc aac cac aac ctc cgg gag ctg gac ttg agt ttc aac gac ctg gga | 2784 |
| Ala Asn His Asn Leu Arg Glu Leu Asp Leu Ser Phe Asn Asp Leu Gly |      |
| 915 920 925   |      |
| gac tgg ggc ctg tgg ttg ctg gct gag ggg ctg caa cat ccc gcc tgc | 2832 |
| Asp Trp Gly Leu Trp Leu Leu Ala Glu Gly Leu Gln His Pro Ala Cys |      |
| 930 935 940   |      |
| aga ctc cag aaa ctg tgg ctg gat agc tgt ggc ctc aca gcc aag gct | 2880 |
| Arg Leu Gln Lys Leu Trp Leu Asp Ser Cys Gly Leu Thr Ala Lys Ala |      |
| 945 950 955 960   |      |
| tgt gag aat ctt tac ttc acc ctg ggg atc aac cag acc ttg acc gac | 2928 |
| Cys Glu Asn Leu Tyr Phe Thr Leu Gly Ile Asn Gln Thr Leu Thr Asp |      |
| 965 970 975   |      |
| ctt tac ctg acc aac aac gcc cta ggg gac aca ggt gtc cga ctg ctt | 2976 |
| Leu Tyr Leu Thr Asn Asn Ala Leu Gly Asp Thr Gly Val Arg Leu Leu |      |
| 980 985 990   |      |

tgc aag cgg ctg agc cat cct ggc tgc aaa ctc cga gtc ctc tgg tta 3024  
Cys Lys Arg Leu Ser His Pro Gly Cys Lys Leu Arg Val Leu Trp Leu  
995 1000 1005

ttt ggg atg gac ctg aat aaa atg acc cac agt agg ttg gca gcg ctt 3072  
Phe Gly Met Asp Leu Asn Lys Met Thr His Ser Arg Leu Ala Ala Leu  
1010 1015 1020

cga gta aca aaa cct tat ttg gac att ggc tgc tga 3108  
Arg Val Thr Lys Pro Tyr Leu Asp Ile Gly Cys  
1025 1030 1035

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<212> PRT  
<213> Homo sapien.

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Leu Glu Glu Leu Glu Ala Val Glu Leu Lys Lys Phe Lys Leu Tyr Leu  
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Gly Thr Ala Thr Glu Leu Gly Glu Gly Lys Ile Pro Trp Gly Ser Met  
35 40 45  
Glu Lys Ala Gly Pro Leu Glu Met Ala Gln Leu Leu Ile Thr His Phe  
50 55 60  
Gly Pro Glu Glu Ala Trp Arg Leu Ala Leu Ser Thr Phe Glu Arg Ile  
65 70 75 80  
Asn Arg Lys Asp Leu Trp Glu Arg Gly Gln Arg Glu Asp Leu Val Arg  
85 90 95  
Asp Pro Gln Glu Thr Tyr Arg Asp Tyr Val Arg Arg Lys Phe Arg Leu  
100 105 110  
Met Glu Asp Arg Asn Ala Arg Leu Gly Glu Cys Val Asn Leu Ser His  
115 120 125  
Arg Tyr Thr Arg Leu Leu Leu Val Lys Glu His Ser Asn Pro Met Gln  
130 135 140  
Val Gln Gln Gln Leu Leu Asp Thr Gly Arg Gly His Ala Arg Thr Val  
145 150 155 160  
Gly His Gln Ala Ser Pro Ile Lys Ile Glu Thr Leu Phe Glu Pro Asp  
165 170 175  
Glu Glu Arg Pro Glu Pro Pro Arg Thr Val Val Met Gln Gly Ala Ala  
180 185 190  
Gly Ile Gly Lys Ser Met Leu Ala His Lys Val Met Leu Asp Trp Ala  
195 200 205  
Asp Gly Lys Leu Phe Gln Gly Arg Phe Asp Tyr Leu Phe Tyr Ile Asn  
210 215 220  
Cys Arg Glu Met Asn Gln Ser Ala Thr Glu Cys Ser Met Gln Asp Leu  
225 230 235 240  
Ile Phe Ser Cys Trp Pro Glu Pro Ser Ala Pro Leu Gln Glu Leu Ile  
245 250 255  
Arg Val Pro Glu Arg Leu Leu Phe Ile Ile Asp Gly Phe Asp Glu Leu  
260 265 270

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Pro | Ser | Phe | His | Asp | Pro | Gln | Gly | Pro | Trp | Cys | Leu | Cys | Trp | Glu |
|     |     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |
| Glu | Lys | Arg | Pro | Thr | Glu | Leu | Leu | Leu | Asn | Ser | Leu | Ile | Arg | Lys | Lys |
|     |     | 290 |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |
| Leu | Leu | Pro | Glu | Leu | Ser | Leu | Leu | Ile | Thr | Thr | Arg | Pro | Thr | Ala | Leu |
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |
| Glu | Lys | Leu | His | Arg | Leu | Leu | Glu | His | Pro | Arg | His | Val | Glu | Ile | Leu |
|     |     |     |     | 325 |     |     |     |     | 330 |     |     |     |     | 335 |     |
| Gly | Phe | Ser | Glu | Ala | Glu | Arg | Lys | Glu | Tyr | Phe | Tyr | Lys | Tyr | Phe | His |
|     |     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |
| Asn | Ala | Glu | Gln | Ala | Gly | Gln | Val | Phe | Asn | Tyr | Val | Arg | Asp | Asn | Glu |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |
| Pro | Leu | Phe | Thr | Met | Cys | Phe | Val | Pro | Leu | Val | Cys | Trp | Val | Val | Cys |
|     |     | 370 |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |
| Thr | Cys | Leu | Gln | Gln | Gln | Leu | Glu | Gly | Gly | Gly | Leu | Leu | Arg | Gln | Thr |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |
| Ser | Arg | Thr | Thr | Thr | Ala | Val | Tyr | Met | Leu | Tyr | Leu | Leu | Ser | Leu | Met |
|     |     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |
| Gln | Pro | Lys | Pro | Gly | Ala | Pro | Arg | Leu | Gln | Pro | Pro | Pro | Asn | Gln | Arg |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |
| Gly | Leu | Cys | Ser | Leu | Ala | Ala | Asp | Gly | Leu | Trp | Asn | Gln | Lys | Ile | Leu |
|     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |
| Phe | Glu | Glu | Gln | Asp | Leu | Arg | Lys | His | Gly | Leu | Asp | Gly | Glu | Asp | Val |
|     |     | 450 |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |
| Ser | Ala | Phe | Leu | Asn | Met | Asn | Ile | Phe | Gln | Lys | Asp | Ile | Asn | Cys | Glu |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |
| Arg | Tyr | Tyr | Ser | Phe | Ile | His | Leu | Ser | Phe | Gln | Glu | Phe | Phe | Ala | Ala |
|     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     | 495 |     |
| Met | Tyr | Tyr | Ile | Leu | Asp | Glu | Gly | Glu | Gly | Gly | Ala | Gly | Pro | Asp | Gln |
|     |     |     | 500 |     |     |     | 505 |     |     |     |     |     | 510 |     |     |
| Asp | Val | Thr | Arg | Leu | Leu | Thr | Glu | Tyr | Ala | Phe | Ser | Glu | Arg | Ser | Phe |
|     |     | 515 |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |
| Leu | Ala | Leu | Thr | Ser | Arg | Phe | Leu | Phe | Gly | Leu | Leu | Asn | Glu | Glu | Thr |
|     |     | 530 |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |
| Arg | Ser | His | Leu | Glu | Lys | Ser | Leu | Cys | Trp | Lys | Val | Ser | Pro | His | Ile |
| 545 |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |
| Lys | Met | Asp | Leu | Leu | Gln | Trp | Ile | Gln | Ser | Lys | Ala | Gln | Ser | Asp | Gly |
|     |     |     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |
| Ser | Thr | Leu | Gln | Gln | Gly | Ser | Leu | Glu | Phe | Phe | Ser | Cys | Leu | Tyr | Glu |
|     |     |     | 580 |     |     |     |     | 585 |     |     |     |     | 590 |     |     |
| Ile | Gln | Glu | Glu | Glu | Phe | Ile | Gln | Gln | Ala | Leu | Ser | His | Phe | Gln | Val |
|     |     | 595 |     |     |     |     | 600 |     |     |     |     | 605 |     |     |     |
| Ile | Val | Val | Ser | Asn | Ile | Ala | Ser | Lys | Met | Glu | His | Met | Val | Ser | Ser |
|     |     | 610 |     |     |     | 615 |     |     |     |     | 620 |     |     |     |     |
| Phe | Cys | Leu |     |     |     |     |     |     |     |     |     |     |     |     |     |

|   |      |      |      |      |
|---|------|------|------|------|
| 690   |      | 695  |      | 700  |
| Lys Leu Leu Cys Gln Gly Leu Arg His Pro Asn Cys Lys Leu Gln Asn |      |      |      |      |
| 705   |      | 710  |      | 715  |
| Leu Arg Leu Lys Arg Cys Arg Ile Ser Ser Ser Ala Cys Glu Asp Leu |      |      |      |      |
|   | 725  |      | 730  | 735  |
| Ser Ala Ala Leu Ile Ala Asn Lys Asn Leu Thr Arg Met Asp Leu Ser |      |      |      |      |
|   | 740  |      | 745  | 750  |
| Gly Asn Gly Val Gly Phe Pro Gly Met Met Leu Leu Cys Glu Gly Leu |      |      |      |      |
|   | 755  |      | 760  | 765  |
| Arg His Pro Gln Cys Arg Leu Gln Met Ile Gln Leu Arg Lys Cys Gln |      |      |      |      |
|   | 770  |      | 775  | 780  |
| Leu Glu Ser Gly Ala Cys Gln Glu Met Ala Ser Val Leu Gly Thr Asn |      |      |      |      |
|   | 785  |      | 790  | 795  |
| Pro His Leu Val Glu Leu Asp Leu Thr Gly Asn Ala Leu Glu Asp Leu |      |      |      |      |
|   | 805  |      | 810  | 815  |
| Gly Leu Arg Leu Leu Cys Gln Gly Leu Arg His Pro Val Cys Arg Leu |      |      |      |      |
|   | 820  |      | 825  | 830  |
| Arg Thr Leu Trp Leu Lys Ile Cys Arg Leu Thr Ala Ala Cys Asp     |      |      |      |      |
|   | 835  |      | 840  | 845  |
| Glu Leu Ala Ser Thr Leu Ser Val Asn Gln Ser Leu Arg Glu Leu Asp |      |      |      |      |
|   | 850  |      | 855  | 860  |
| Leu Ser Leu Asn Glu Leu Gly Asp Leu Gly Val Leu Leu Leu Cys Glu |      |      |      |      |
|   | 865  |      | 870  | 875  |
| Gly Leu Arg His Pro Thr Cys Lys Leu Gln Thr Leu Arg Leu Gly Ile |      |      |      |      |
|   | 885  |      | 890  | 895  |
| Cys Arg Leu Gly Ser Ala Ala Cys Glu Gly Leu Ser Val Val Leu Gln |      |      |      |      |
|   | 900  |      | 905  | 910  |
| Ala Asn His Asn Leu Arg Glu Leu Asp Leu Ser Phe Asn Asp Leu Gly |      |      |      |      |
|   | 915  |      | 920  | 925  |
| Asp Trp Gly Leu Trp Leu Leu Ala Glu Gly Leu Gln His Pro Ala Cys |      |      |      |      |
|   | 930  |      | 935  | 940  |
| Arg Leu Gln Lys Leu Trp Leu Asp Ser Cys Gly Leu Thr Ala Lys Ala |      |      |      |      |
|   | 945  |      | 950  | 955  |
| Cys Glu Asn Leu Tyr Phe Thr Leu Gly Ile Asn Gln Thr Leu Thr Asp |      |      |      |      |
|   | 965  |      | 970  | 975  |
| Leu Tyr Leu Thr Asn Asn Ala Leu Gly Asp Thr Gly Val Arg Leu Leu |      |      |      |      |
|   | 980  |      | 985  | 990  |
| Cys Lys Arg Leu Ser His Pro Gly Cys Lys Leu Arg Val Leu Trp Leu |      |      |      |      |
|   | 995  |      | 1000 | 1005 |
| Phe Gly Met Asp Leu Asn Lys Met Thr His Ser Arg Leu Ala Ala Leu |      |      |      |      |
|   | 1010 |      | 1015 | 1020 |
| Arg Val Thr Lys Pro Tyr Leu Asp Ile Gly Cys                     |      |      |      |      |
| 1025  |      | 1030 |      | 1035 |

<210> 25  
 <211> 243  
 <212> DNA  
 <213> Homo sapien

<220>  
 <221> CDS  
 <222> (1) ... (243)

<400> 25

|   |    |
|---|----|
| atg gca agc acc cgc tgc aag ctg gcc agg tac ctg gag gac ctg gag | 48 |
| Met Ala Ser Thr Arg Cys Lys Leu Ala Arg Tyr Leu Glu Asp Leu Glu |    |
| 1 5 10 15   |    |

|   |    |
|---|----|
| gat gtg gac ttg aag aaa ttt aag atg cac tta gag gac tat cct ccc | 96 |
| Asp Val Asp Leu Lys Lys Phe Lys Met His Leu Glu Asp Tyr Pro Pro |    |
| 20 25 30  |    |

|   |     |
|---|-----|
| cag aag ggc tgc atc ccc ctc ccg agg ggt cag aca gag aag gca gac | 144 |
| Gln Lys Gly Cys Ile Pro Leu Pro Arg Gly Gln Thr Glu Lys Ala Asp |     |
| 35 40 45  |     |

|   |     |
|---|-----|
| cat gtg gat cta gcc acg cta atg atc gac ttc aat ggg gag gag aag | 192 |
| His Val Asp Leu Ala Thr Leu Met Ile Asp Phe Asn Gly Glu Glu Lys |     |
| 50 55 60  |     |

|   |     |
|---|-----|
| gcg tgg gcc atg gtc gtg tgg atc ttc gct gcg atc aac agg aga gac | 240 |
| Ala Trp Ala Met Val Val Trp Ile Phe Ala Ala Ile Asn Arg Arg Asp |     |
| 65 70 75 80   |     |

|     |     |
|-----|-----|
| ctt | 243 |
| Leu |     |

<210> 26

<211> 81

<212> PRT

<213> Homo sapien

<400> 26

|   |  |
|---|--|
| Met Ala Ser Thr Arg Cys Lys Leu Ala Arg Tyr Leu Glu Asp Leu Glu |  |
| 1 5 10 15   |  |
| Asp Val Asp Leu Lys Lys Phe Lys Met His Leu Glu Asp Tyr Pro Pro |  |
| 20 25 30  |  |
| Gln Lys Gly Cys Ile Pro Leu Pro Arg Gly Gln Thr Glu Lys Ala Asp |  |
| 35 40 45  |  |
| His Val Asp Leu Ala Thr Leu Met Ile Asp Phe Asn Gly Glu Glu Lys |  |
| 50 55 60  |  |
| Ala Trp Ala Met Val Val Trp Ile Phe Ala Ala Ile Asn Arg Arg Asp |  |
| 65 70 75 80   |  |
| Leu   |  |

<210> 27

<211> 270

<212> DNA

<213> Homo sapien

<220>

<221> CDS

<222> (1)...(267)

<400> 27

|   |     |
|---|-----|
| atg gga acg aag cgc gag gcc atc ctg aag gtg ctg gag aac ctg aca | 48  |
| Met Gly Thr Lys Arg Glu Ala Ile Leu Lys Val Leu Glu Asn Leu Thr |     |
| 1 5 10 15   |     |
| ccg gag gag ctc aag aag ttc aag atg aag ctg ggg acg gtg ccg ctg | 96  |
| Pro Glu Glu Leu Lys Lys Phe Lys Met Lys Leu Gly Thr Val Pro Leu |     |
| 20 25 30  |     |
| cgc gag ggc ttt gag cgc atc ccg cgg ggc gcg ctc ggg cag cta gat | 144 |
| Arg Glu Gly Phe Glu Arg Ile Pro Arg Gly Ala Leu Gly Gln Leu Asp |     |
| 35 40 45  |     |
| atc gtg gac ctc acc gac aag ctg gtc gcc tcc tac tac gag gac tac | 192 |
| Ile Val Asp Leu Thr Asp Lys Leu Val Ala Ser Tyr Tyr Glu Asp Tyr |     |
| 50 55 60  |     |
| gca gcc gag ctc gtc gtg gcc gtg ctg cgc gac atg cgc atg ttg gag | 240 |
| Ala Ala Glu Leu Val Val Ala Val Leu Arg Asp Met Arg Met Leu Glu |     |
| 65 70 75 80   |     |
| gag gcc gca cgg ctg cag cgg gct gcg tga                         | 270 |
| Glu Ala Ala Arg Leu Gln Arg Ala Ala                             |     |
| 85  |     |

<210> 28

<211> 89

<212> PRT

<213> Homo sapien

<400> 28

|   |  |
|---|--|
| Met Gly Thr Lys Arg Glu Ala Ile Leu Lys Val Leu Glu Asn Leu Thr |  |
| 1 5 10 15   |  |
| Pro Glu Glu Leu Lys Lys Phe Lys Met Lys Leu Gly Thr Val Pro Leu |  |
| 20 25 30  |  |
| Arg Glu Gly Phe Glu Arg Ile Pro Arg Gly Ala Leu Gly Gln Leu Asp |  |
| 35 40 45  |  |
| Ile Val Asp Leu Thr Asp Lys Leu Val Ala Ser Tyr Tyr Glu Asp Tyr |  |
| 50 55 60  |  |
| Ala Ala Glu Leu Val Val Ala Val Leu Arg Asp Met Arg Met Leu Glu |  |
| 65 70 75 80   |  |
| Glu Ala Ala Arg Leu Gln Arg Ala Ala                             |  |
| 85  |  |

<210> 29

<211> 6

<212> PRT

<213> Homo sapien

<220>  
<221> VARIANT  
<222> (4)...(5)  
<223> Xaa=any amino acid

<221> VARIANT  
<222> 4, 5  
<223> Xaa = Any Amino Acid

<400> 29  
Lys Phe Lys Xaa Xaa Leu  
1 5

<210> 30  
<211> 6  
<212> PRT  
<213> Homo sapien

<220>  
<221> VARIANT  
<222> (4)...(5)  
<223> Xaa=any amino acid

<221> VARIANT  
<222> 4, 5  
<223> Xaa = Any Amino Acid

<400> 30  
Lys Leu Lys Xaa Xaa Leu  
1 5

<210> 31  
<211> 6  
<212> PRT  
<213> Homo sapien

<220>  
<221> VARIANT  
<222> (4)...(5)  
<223> Xaa=any amino acid

<221> VARIANT  
<222> 4, 5  
<223> Xaa = Any Amino Acid

<400> 31  
Arg Phe Arg Xaa Xaa Leu  
1 5



<210> 32  
<211> 6  
<212> PRT  
<213> Homo sapien

<220>  
<221> VARIANT  
<222> (4)...(5)  
<223> Xaa=any amino acid

<221> VARIANT  
<222> 4, 5  
<223> Xaa = Any Amino Acid

<400> 32  
Arg Phe Lys Xaa Xaa Leu  
1 5

<210> 33  
<211> 6  
<212> PRT  
<213> Homo sapien

<220>  
<221> VARIANT  
<222> (4)...(5)  
<223> Xaa=any amino acid

<221> VARIANT  
<222> 4, 5  
<223> Xaa = Any Amino Acid

<400> 33  
Lys Phe Arg Xaa Xaa Leu  
1 5

<210> 34  
<211> 6  
<212> PRT  
<213> Homo sapien

<220>  
<221> VARIANT  
<222> (4)...(5)  
<223> Xaa=any amino acid

<221> VARIANT  
<222> 4, 5  
<223> Xaa = Any Amino Acid

<400> 34

Lys Phe Lys Xaa Xaa Ile

1 5

<210> 35

<211> 39

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetic primer

<400> 35

ccggaattca ccattgcagc ctctttcttc tctgatttt

39

<210> 36

<211> 41

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetic primer

<400> 36

ccgctcgagt cacgtagagc tgtgttcac cttttctta a

41

<210> 37

<211> 319

<212> PRT

<213> Homo sapiens

<400> 37

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gln | Pro | Arg | Thr | Val | Ile | Ile | Gln | Gly | Pro | Gln | Gly | Ile | Gly | Lys | Thr |
| 1   |     |     |     | 5   |     |     |     | 10  |     |     |     |     | 15  |     |     |
| Thr | Leu | Leu | Met | Lys | Leu | Met | Met | Ala | Trp | Ser | Asp | Asn | Lys | Ile | Phe |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Arg | Asp | Arg | Phe | Leu | Tyr | Thr | Phe | Tyr | Phe | Cys | Cys | Arg | Glu | Leu | Arg |
|     |     | 35  |     |     |     | 40  |     |     |     |     | 45  |     |     |     |     |
| Glu | Leu | Pro | Pro | Thr | Ser | Leu | Ala | Asp | Leu | Ile | Ser | Arg | Glu | Trp | Pro |
|     | 50  |     |     |     |     | 55  |     |     |     | 60  |     |     |     |     |     |
| Asp | Pro | Ala | Ala | Pro | Ile | Thr | Glu | Ile | Val | Ser | Gln | Pro | Glu | Arg | Leu |
| 65  |     |     |     | 70  |     |     |     | 75  |     |     |     |     | 80  |     |     |
| Leu | Phe | Val | Ile | Asp | Ser | Phe | Glu | Glu | Leu | Gln | Gly | Gly | Leu | Asn | Glu |
|     |     |     | 85  |     |     |     | 90  |     |     |     |     |     | 95  |     |     |
| Pro | Asp | Ser | Asp | Leu | Cys | Gly | Asp | Leu | Met | Glu | Lys | Arg | Pro | Val | Gln |
|     |     | 100 |     |     |     | 105 |     |     |     |     |     | 110 |     |     |     |
| Val | Leu | Leu | Ser | Ser | Leu | Leu | Arg | Lys | Lys | Met | Leu | Pro | Glu | Ala | Ser |
|     | 115 |     |     |     | 120 |     |     |     |     |     | 125 |     |     |     |     |
| Leu | Leu | Ile | Ala | Ile | Lys | Pro | Val | Cys | Pro | Lys | Glu | Leu | Arg | Asp | Gln |
|     | 130 |     |     | 135 |     |     |     |     |     | 140 |     |     |     |     |     |
| Val | Thr | Ile | Ser | Glu | Ile | Tyr | Gln | Pro | Arg | Gly | Phe | Asn | Glu | Ser | Asp |
| 145 |     |     |     | 150 |     |     |     |     | 155 |     |     |     | 160 |     |     |
| Arg | Leu | Val | Tyr | Phe | Cys | Cys | Phe | Phe | Lys | Asp | Pro | Lys | Arg | Ala | Met |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
|     |     |     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |  |  |
| Glu | Ala | Phe | Asn | Leu | Val | Arg | Glu | Ser | Glu | Gln | Leu | Phe | Ser | Ile | Cys |  |  |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |  |  |
| Gln | Ile | Pro | Leu | Leu | Cys | Trp | Ile | Leu | Cys | Thr | Ser | Leu | Lys | Gln | Glu |  |  |
|     |     | 195 |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |  |  |
| Met | Gln | Lys | Gly | Lys | Asp | Leu | Ala | Leu | Thr | Cys | Gln | Ser | Thr | Thr | Ser |  |  |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |  |  |
| Val | Tyr | Ser | Ser | Phe | Val | Phe | Asn | Leu | Phe | Thr | Pro | Glu | Gly | Ala | Glu |  |  |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |  |  |
| Gly | Pro | Thr | Pro | Gln | Thr | Gln | His | Gln | Leu | Lys | Ala | Leu | Cys | Ser | Leu |  |  |
|     |     |     | 245 |     |     |     |     | 250 |     |     |     |     |     | 255 |     |  |  |
| Ala | Ala | Glu | Gly | Met | Trp | Thr | Asp | Thr | Phe | Glu | Phe | Cys | Glu | Asp | Asp |  |  |
|     |     | 260 |     |     |     |     | 265 |     |     |     |     | 270 |     |     |     |  |  |
| Leu | Arg | Arg | Asn | Gly | Val | Val | Asp | Ala | Asp | Ile | Pro | Ala | Leu | Leu | Gly |  |  |
|     | 275 |     |     |     |     | 280 |     |     |     | 285 |     |     |     |     |     |  |  |
| Thr | Lys | Ile | Leu | Leu | Lys | Tyr | Gly | Glu | Arg | Glu | Ser | Ser | Tyr | Val | Phe |  |  |
|     | 290 |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |     |  |  |
| Leu | His | Val | Cys | Ile | Gln | Glu | Phe | Cys | Ala | Ala | Leu | Phe | Tyr | Leu |     |  |  |
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     |     |  |  |

<210> 38  
 <211> 270  
 <212> PRT  
 <213> Homo sapiens

<400> 38

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| Ser | Ile | Cys | Gln | Ile | Pro | Leu | Leu | Cys | Trp | Ile | Leu | Cys | Thr | Ser | Leu |  |  |
| 1   |     |     |     | 5   |     |     |     | 10  |     |     |     |     | 15  |     |     |  |  |
| Lys | Gln | Glu | Met | Gln | Lys | Gly | Lys | Asp | Leu | Ala | Leu | Thr | Cys | Gln | Ser |  |  |
|     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |     |  |  |
| Thr | Thr | Ser | Val | Tyr | Ser | Ser | Phe | Val | Phe | Asn | Leu | Phe | Thr | Pro | Glu |  |  |
|     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |     |  |  |
| Gly | Ala | Glu | Gly | Pro | Thr | Pro | Gln | Thr | Gln | His | Gln | Leu | Lys | Ala | Leu |  |  |
|     | 50  |     |     |     | 55  |     |     |     | 60  |     |     |     |     |     |     |  |  |
| Cys | Ser | Leu | Ala | Ala | Glu | Gly | Met | Trp | Thr | Asp | Thr | Phe | Glu | Phe | Cys |  |  |
| 65  |     |     |     | 70  |     |     |     | 75  |     |     |     |     |     |     | 80  |  |  |
| Glu | Asp | Asp | Leu | Arg | Arg | Asn | Gly | Val | Val | Asp | Ala | Asp | Ile | Pro | Ala |  |  |
|     |     | 85  |     |     |     | 90  |     |     |     |     |     | 95  |     |     |     |  |  |
| Leu | Leu | Gly | Thr | Lys | Ile | Leu | Leu | Lys | Tyr | Gly | Glu | Arg | Glu | Ser | Ser |  |  |
|     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |     |     |  |  |
| Tyr | Val | Phe | Leu | His | Val | Cys | Ile | Gln | Glu | Phe | Cys | Ala | Ala | Leu | Phe |  |  |
|     | 115 |     |     |     | 120 |     |     |     |     |     | 125 |     |     |     |     |  |  |
| Tyr | Leu | Leu | Lys | Ser | His | Leu | Asp | His | Pro | His | Pro | Ala | Val | Arg | Cys |  |  |
|     | 130 |     |     |     | 135 |     |     |     |     |     | 140 |     |     |     |     |  |  |
| Val | Gln | Glu | Leu | Leu | Val | Ala | Asn | Phe | Glu | Lys | Ala | Arg | Arg | Ala | His |  |  |
| 145 |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     |     | 160 |  |  |
| Trp | Ile | Phe | Leu | Gly | Cys | Phe | Leu | Thr | Gly | Leu | Leu | Asn | Lys | Lys | Glu |  |  |
|     |     | 165 |     |     |     |     |     | 170 |     |     |     |     |     | 175 |     |  |  |
| Gln | Glu | Lys | Leu | Asp | Ala | Phe | Phe | Gly | Phe | Gln | Leu | Ser | Gln | Glu | Ile |  |  |
|     | 180 |     |     |     |     |     |     | 185 |     |     |     |     | 190 |     |     |  |  |
| Lys | Gln | Gln | Ile | His | Gln | Cys | Leu | Lys | Ser | Leu | Gly | Glu | Arg | Gly | Asn |  |  |
|     | 195 |     |     |     |     | 200 |     |     |     |     |     | 205 |     |     |     |  |  |

Pro Gln Gly Gln Val Asp Ser Leu Ala Ile Phe Tyr Cys Leu Phe Glu  
 210 215 220  
 Met Gln Asp Pro Ala Phe Val Lys Gln Ala Val Asn Leu Leu Gln Glu  
 225 230 235 240  
 Ala Asn Phe His Ile Ile Asp Asn Val Asp Leu Val Val Ser Ala Tyr  
 245 250 255  
 Cys Leu Lys Tyr Cys Ser Ser Leu Arg Lys Leu Cys Phe Ser  
 260 265 270

<210> 39  
 <211> 375  
 <212> PRT  
 <213> Homo sapiens

<400> 39  
 Ser Asp Tyr Ser Leu Ile Cys Trp His His Ile Cys Ser Val Leu Thr  
 1 5 10 15  
 Thr Ser Gly His Leu Arg Glu Leu Gln Val Gln Asp Ser Thr Leu Ser  
 20 25 30  
 Glu Ser Thr Phe Val Thr Trp Cys Asn Gln Leu Arg His Pro Ser Cys  
 35 40 45  
 Arg Leu Gln Lys Leu Gly Ile Asn Asn Val Ser Phe Ser Gly Gln Ser  
 50 55 60  
 Val Leu Leu Phe Glu Val Leu Phe Tyr Gln Pro Asp Leu Lys Tyr Leu  
 65 70 75 80  
 Ser Phe Thr Leu Thr Lys Leu Ser Arg Asp Asp Ile Arg Ser Leu Cys  
 85 90 95  
 Asp Ala Leu Asn Tyr Pro Ala Gly Asn Val Lys Glu Leu Ala Leu Val  
 100 105 110  
 Asn Cys His Leu Ser Pro Ile Asp Cys Glu Val Leu Ala Gly Leu Leu  
 115 120 125  
 Thr Asn Asn Lys Lys Leu Thr Tyr Leu Asn Val Ser Cys Asn Gln Leu  
 130 135 140  
 Asp Thr Gly Val Pro Leu Leu Cys Glu Ala Leu Cys Ser Pro Asp Thr  
 145 150 155 160  
 Val Leu Val Tyr Leu Met Leu Ala Phe Cys His Leu Ser Glu Gln Cys  
 165 170 175  
 Cys Glu Tyr Ile Ser Glu Met Leu Leu Arg Asn Lys Ser Val Arg Tyr  
 180 185 190  
 Leu Asp Leu Ser Ala Asn Val Leu Lys Asp Glu Gly Leu Lys Thr Leu  
 195 200 205  
 Cys Glu Ala Leu Lys His Pro Asp Cys Cys Leu Asp Ser Leu Cys Leu  
 210 215 220  
 Val Lys Cys Phe Ile Thr Ala Ala Gly Cys Glu Asp Leu Ala Ser Ala  
 225 230 235 240  
 Leu Ile Ser Asn Gln Asn Leu Lys Ile Leu Gln Ile Gly Cys Asn Glu  
 245 250 255  
 Ile Gly Asp Val Gly Val Gln Leu Leu Cys Arg Ala Leu Thr His Thr  
 260 265 270  
 Asp Cys Arg Leu Glu Ile Leu Gly Leu Glu Glu Cys Gly Leu Thr Ser  
 275 280 285  
 Thr Cys Cys Lys Asp Leu Ala Ser Val Leu Thr Cys Ser Lys Thr Leu

|                                     |                                 |                 |             |     |
|-------------------------------------|---------------------------------|-----------------|-------------|-----|
| 290                                 |                                 | 295             |             | 300 |
| Gln Gln Leu Asn Leu Thr             | Leu Asn Thr                     | Leu Asp His Thr | Gly Val Val |     |
| 305                                 | 310                             | 315             | 320         |     |
| Val Leu Cys Glu Ala Leu Arg His Pro | Glu Cys Ala Leu Gln Val Leu     |                 |             |     |
|                                     | 325                             | 330             | 335         |     |
| Gly Leu Arg Lys Thr Asp Phe Asp     | Glu Glu Thr Gln Ala Leu Leu Thr |                 |             |     |
|                                     | 340                             | 345             | 350         |     |
| Ala Glu Glu Glu Arg Asn Pro Asn     | Leu Thr Ile Thr Asp Asp Cys Asp |                 |             |     |
|                                     | 355                             | 360             | 365         |     |
| Thr Ile Thr Arg Val Glu Ile         |                                 |                 |             |     |
| 370                                 | 375                             |                 |             |     |

<210> 40  
 <211> 38  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> synthetic primer

<400> 40  
 cctctcgagt cagatctcta cccttgatggt tgtgtcac 38

<210> 41  
 <211> 24  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> synthetic primer

<400> 41  
 gaattcgatc ctggagccat gggg 24

<210> 42  
 <211> 24  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> synthetic primer

<400> 42  
 ctcgagccgg agtggtgctg ggaa 24

<210> 43  
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 <212> DNA  
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<220>  
 <223> synthetic primer

<400> 43  
gaattcgatc ctggagccat gggg 24

<210> 44  
<211> 24  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> synthetic primer

<400> 44  
ctcgagtcag cttggctgcc gact 24

<210> 45  
<211> 31  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> synthetic primer

<400> 45  
ccccctcgag ggctggctt ggctgccgac t 31

<210> 46  
<211> 24  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> synthetic primer

<400> 46  
gaattccctc agtcggcagc caag 24

<210> 47  
<211> 24  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> synthetic primer

<400> 47  
ctcgagccgg agtggttgctg ggaa 24

<210> 48  
<211> 22  
<212> DNA  
<213> Artificial Sequence

<220>

<223> synthetic primer

<400> 48

gaattcgagg cgcagggctg tg

22

<210> 49

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetic primer

<400> 49

ctcgaggctt cacaggcgtt gcat

24

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29

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<222> (306)...(458)  
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actgcctggt atcttagtgt ggaccgaagc ctaaggaccc tgaaaacagc tgcag atg 178  
Met  
1

aag atg gca agc acc cgc tgc aag ctg gcc agg tac ctg gag gac ctg 226  
Lys Met Ala Ser Thr Arg Cys Lys Leu Ala Arg Tyr Leu Glu Asp Leu  
5 10 15

gag gat gtg gac ttg aag aaa ttt aag atg cac tta gag gac tat cct 274  
Glu Asp Val Asp Leu Lys Lys Phe Lys Met His Leu Glu Asp Tyr Pro  
20 25 30

ccc cag aag ggc tgc atc ccc ctc ccg agg gnn nnn nnn nnn nnn nnn 322  
Pro Gln Lys Gly Cys Ile Pro Leu Pro Arg Xaa Xaa Xaa Xaa Xaa Xaa  
35 40 45

nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn 370  
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
50 55 60 65

nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn 418  
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
70 75 80

nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn ngt tca gat 466  
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Ser Asp  
85 90 95

aat gca cgt gtt tcg aat ccc act gtg ata tgc cag gaa gac agc att 514  
Asn Ala Arg Val Ser Asn Pro Thr Val Ile Cys Gln Glu Asp Ser Ile  
100 105 110

gaa gag gag tgg atg ggt tta ctg gag tac ctt tcg aga atc tct att 562  
Glu Glu Glu Trp Met Gly Leu Leu Glu Tyr Leu Ser Arg Ile Ser Ile  
115 120 125

tgt aaa atg aag aaa gat tac cgt aag aag tac aga aag tac gtg aga 610  
Cys Lys Met Lys Lys Asp Tyr Arg Lys Lys Tyr Arg Lys Tyr Val Arg

| 130   | 135 | 140 | 145 |      |
|---|-----|-----|-----|------|
| agc aga ttc cag tgc att gaa gac agg aat gcc cgt ctg ggt gag agt |     |     |     | 658  |
| Ser Arg Phe Gln Cys Ile Glu Asp Arg Asn Ala Arg Leu Gly Glu Ser |     |     |     |      |
|   | 150 | 155 | 160 |      |
| gtg agc ctc aac aaa cgc tac aca cga ctg cgt ctc atc aag gag cac |     |     |     | 706  |
| Val Ser Leu Asn Lys Arg Tyr Thr Arg Leu Arg Leu Ile Lys Glu His |     |     |     |      |
|   | 165 | 170 | 175 |      |
| cgg agc cag cag gag agg gag cag gag ctt ctg gcc atc ggc aag acc |     |     |     | 754  |
| Arg Ser Gln Gln Glu Arg Glu Gln Glu Leu Leu Ala Ile Gly Lys Thr |     |     |     |      |
|   | 180 | 185 | 190 |      |
| aag acg tgt gag agc ccc gtg agt ccc att aag atg gag ttg ctg ttt |     |     |     | 802  |
| Lys Thr Cys Glu Ser Pro Val Ser Pro Ile Lys Met Glu Leu Leu Phe |     |     |     |      |
|   | 195 | 200 | 205 |      |
| gac ccc gat gat gag cat tct gag cct gtg cac acc gtg gtg ttc cag |     |     |     | 850  |
| Asp Pro Asp Asp Glu His Ser Glu Pro Val His Thr Val Val Phe Gln |     |     |     |      |
|   | 210 | 215 | 220 | 225  |
| ggg gcg gca ggg att ggg aaa aca atc ctg gcc agg aag atg atg ttg |     |     |     | 898  |
| Gly Ala Ala Gly Ile Gly Lys Thr Ile Leu Ala Arg Lys Met Met Leu |     |     |     |      |
|   | 230 | 235 | 240 |      |
| gac tgg gcg tcg ggg aca ctc tac caa gac agg ttt gac tat ctg ttc |     |     |     | 946  |
| Asp Trp Ala Ser Gly Thr Leu Tyr Gln Asp Arg Phe Asp Tyr Leu Phe |     |     |     |      |
|   | 245 | 250 | 255 |      |
| tat atc cac tgt cga gag gtg agc ctt gtg aca cag agg agc ctg ggg |     |     |     | 994  |
| Tyr Ile His Cys Arg Glu Val Ser Leu Val Thr Gln Arg Ser Leu Gly |     |     |     |      |
|   | 260 | 265 | 270 |      |
| gac ctg atc atg agc tgc tgc ccc gac cca aac cca ccc atc cac aag |     |     |     | 1042 |
| Asp Leu Ile Met Ser Cys Cys Pro Asp Pro Asn Pro Pro Ile His Lys |     |     |     |      |
|   | 275 | 280 | 285 |      |
| atc gtg aga aaa ccc tcc aga atc ctc ttc ctc atg gac ggc ttc gat |     |     |     | 1090 |
| Ile Val Arg Lys Pro Ser Arg Ile Leu Phe Leu Met Asp Gly Phe Asp |     |     |     |      |
|   | 290 | 295 | 300 | 305  |
| gag ctg caa ggt gcc ttt gac gag cac ata gga ccg ctc tgc act gac |     |     |     | 1138 |
| Glu Leu Gln Gly Ala Phe Asp Glu His Ile Gly Pro Leu Cys Thr Asp |     |     |     |      |
|   | 310 | 315 | 320 |      |
| tgg cag aag gcc gag cgg gga gac att ctc ctg agc agc ctc atc aga |     |     |     | 1186 |
| Trp Gln Lys Ala Glu Arg Gly Asp Ile Leu Leu Ser Ser Leu Ile Arg |     |     |     |      |
|   | 325 | 330 | 335 |      |
| aag aag ctg ctt ccc gag gcc tct ctg ctc atc acc acg aga cct gtg |     |     |     | 1234 |
| Lys Lys Leu Leu Pro Glu Ala Ser Leu Leu Ile Thr Thr Arg Pro Val |     |     |     |      |
|   | 340 | 345 | 350 |      |

|   |      |
|---|------|
| gcc ctg gag aaa ctg cag cac ttg ctg gac cat cct cgg cat gtg gag | 1282 |
| Ala Leu Glu Lys Leu Gln His Leu Leu Asp His Pro Arg His Val Glu |      |
| 355 360 365   |      |
| atc ctg ggt ttc tcc gag gcc aaa agg aaa gag tac ttc ttc aag tac | 1330 |
| Ile Leu Gly Phe Ser Glu Ala Lys Arg Lys Glu Tyr Phe Phe Lys Tyr |      |
| 370 375 380 385   |      |
| ttc tct gat gag gcc caa gcc agg gca gcc ttc agt ctg att cag gag | 1378 |
| Phe Ser Asp Glu Ala Gln Ala Arg Ala Ala Phe Ser Leu Ile Gln Glu |      |
| 390 395 400   |      |
| aac gag gtc ctc ttc acc atg tgc ttc atc ccc ctg gtc tgc tgg atc | 1426 |
| Asn Glu Val Leu Phe Thr Met Cys Phe Ile Pro Leu Val Cys Trp Ile |      |
| 405 410 415   |      |
| gtg tgc act gga ctg aaa cag cag atg gag agt ggc aag agc ctt gcc | 1474 |
| Val Cys Thr Gly Leu Lys Gln Gln Met Glu Ser Gly Lys Ser Leu Ala |      |
| 420 425 430   |      |
| cag aca tcc aag acc acc acc gcg gtg tac gtc ttc ttc ctt tcc agt | 1522 |
| Gln Thr Ser Lys Thr Thr Thr Ala Val Tyr Val Phe Phe Leu Ser Ser |      |
| 435 440 445   |      |
| ttg ctg cag ccc cgg gga ggg agc cag gag cac ggc ctc tgc gcc cac | 1570 |
| Leu Leu Gln Pro Arg Gly Gly Ser Gln Glu His Gly Leu Cys Ala His |      |
| 450 455 460 465   |      |
| ctc tgg ggg ctc tgc tct ttg gct gca gat gga atc tgg aac cag aaa | 1618 |
| Leu Trp Gly Leu Cys Ser Leu Ala Ala Asp Gly Ile Trp Asn Gln Lys |      |
| 470 475 480   |      |
| atc ctg ttt gag gag tcc gac ctc agg aat cat gga ctg cag aag gcg | 1666 |
| Ile Leu Phe Glu Glu Ser Asp Leu Arg Asn His Gly Leu Gln Lys Ala |      |
| 485 490 495   |      |
| gat gtg tct gct ttc ctg agg atg aac ctg ttc caa aag gaa gtg gac | 1714 |
| Asp Val Ser Ala Phe Leu Arg Met Asn Leu Phe Gln Lys Glu Val Asp |      |
| 500 505 510   |      |
| tgc gag aag ttc tac agc ttc atc cac atg act ttc cag gag ttc ttt | 1762 |
| Cys Glu Lys Phe Tyr Ser Phe Ile His Met Thr Phe Gln Glu Phe Phe |      |
| 515 520 525   |      |
| gcc gcc atg tac tac ctg ctg gaa gag gaa aag gaa gga agg acg aac | 1810 |
| Ala Ala Met Tyr Tyr Leu Leu Glu Glu Glu Lys Glu Gly Arg Thr Asn |      |
| 530 535 540 545   |      |
| gtt cca ggg agt cgt ttg aag ctt ccc agc cga gac gtg aca gtc ctt | 1858 |
| Val Pro Gly Ser Arg Leu Lys Leu Pro Ser Arg Asp Val Thr Val Leu |      |
| 550 555 560   |      |

ctg gaa aac tat ggc aaa ttc gaa aag ggg tat ttg att ttt gtt gta 1906  
Leu Glu Asn Tyr Gly Lys Phe Glu Lys Gly Tyr Leu Ile Phe Val Val  
565 570 575

cgt ttc ctc ttt ggc ctg gta aac cag gag agg acc tcc tac ttg gag 1954  
Arg Phe Leu Phe Gly Leu Val Asn Gln Glu Arg Thr Ser Tyr Leu Glu  
580 585 590

aag aaa tta agt tgc aag atc tct cag caa atc agg ctg gag ctg ctg 2002  
Lys Lys Leu Ser Cys Lys Ile Ser Gln Gln Ile Arg Leu Glu Leu Leu  
595 600 605

aaa tgg att gaa gtg aaa gcc aaa gct aaa aag ctg cag atc cag ccc 2050  
Lys Trp Ile Glu Val Lys Ala Lys Ala Lys Lys Leu Gln Ile Gln Pro  
610 615 620 625

agc cag ctg gaa ttg ttc tac tgt ttg tac gag atg cag gag gag gac 2098  
Ser Gln Leu Glu Leu Phe Tyr Cys Leu Tyr Glu Met Gln Glu Glu Asp  
630 635 640

ttc gtg caa agg gcc atg gac tat ttc ccc aag att gag atc aat ctc 2146  
Phe Val Gln Arg Ala Met Asp Tyr Phe Pro Lys Ile Glu Ile Asn Leu  
645 650 655

tcc acc aga atg gac cac atg gtt tct tcc ttt tgc att gag aac tgt 2194  
Ser Thr Arg Met Asp His Met Val Ser Ser Phe Cys Ile Glu Asn Cys  
660 665 670

cat cgg gtg gag tca ctg tcc ctg ggg ttt ctc cat aac atg ccc aag 2242  
His Arg Val Glu Ser Leu Ser Leu Gly Phe Leu His Asn Met Pro Lys  
675 680 685

gag gaa gag gag gag gaa aag gaa ggc cga cac ctt gat atg gtg cag 2290  
Glu Glu Glu Glu Glu Glu Lys Glu Gly Arg His Leu Asp Met Val Gln  
690 695 700 705

tgt gtc ctc cca agc tcc tct cat gct gcc tgt tct cat ggg 2332  
Cys Val Leu Pro Ser Ser Ser His Ala Ala Cys Ser His Gly  
710 715

taaggaaaact cggcttccag gtgcttcttc ctgcttcttc gccagcttct tcttggcgct 2392  
tgcttctct catctctttt caactatctt ccaaatactg ttgccacagc tacatcataa 2452  
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<213> Homo sapiens

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59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71

<223> Xaa = Any Amino Acid

<221> VARIANT

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87, 88, 89, 90, 91, 92, 93, 94, 95

<223> Xaa = Any Amino Acid

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Lys | Met | Ala | Ser | Thr | Arg | Cys | Lys | Leu | Ala | Arg | Tyr | Leu | Glu | Asp | 1   | 5   | 10  | 15  |
| Leu | Glu | Asp | Val | Asp | Leu | Lys | Lys | Phe | Lys | Met | His | Leu | Glu | Asp | Tyr | 20  | 25  | 30  |     |
| Pro | Pro | Gln | Lys | Gly | Cys | Ile | Pro | Leu | Pro | Arg | Xaa | Xaa | Xaa | Xaa | Xaa | 35  | 40  | 45  |     |
| Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | 50  | 55  | 60  |     |
| Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | 65  | 70  | 75  | 80  |
| Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Ser | 85  | 90  | 95  |     |
| Asp | Asn | Ala | Arg | Val | Ser | Asn | Pro | Thr | Val | Ile | Cys | Gln | Glu | Asp | Ser | 100 | 105 | 110 |     |
| Ile | Glu | Glu | Glu | Trp | Met | Gly | Leu | Leu | Glu | Tyr | Leu | Ser | Arg | Ile | Ser | 115 | 120 | 125 |     |
| Ile | Cys | Lys | Met | Lys | Lys | Asp | Tyr | Arg | Lys | Lys | Tyr | Arg | Lys | Tyr | Val | 130 | 135 | 140 |     |
| Arg | Ser | Arg | Phe | Gln | Cys | Ile | Glu | Asp | Arg | Asn | Ala | Arg | Leu | Gly | Glu | 145 | 150 | 155 | 160 |
| Ser | Val | Ser | Leu | Asn | Lys | Arg | Tyr | Thr | Arg | Leu | Arg | Leu | Ile | Lys | Glu | 165 | 170 | 175 |     |
| His | Arg | Ser | Gln | Gln | Glu | Arg | Glu | Gln | Glu | Leu | Leu | Ala | Ile | Gly | Lys | 180 | 185 | 190 |     |
| Thr | Lys | Thr | Cys | Glu | Ser | Pro | Val | Ser | Pro | Ile | Lys | Met | Glu | Leu | Leu | 195 | 200 | 205 |     |
| Phe | Asp | Pro | Asp | Asp | Glu | His | Ser | Glu | Pro | Val | His | Thr | Val | Val | Phe | 210 | 215 | 220 |     |
| Gln | Gly | Ala | Ala | Gly | Ile | Gly | Lys | Thr | Ile | Leu | Ala | Arg | Lys | Met | Met | 225 | 230 | 235 | 240 |
| Leu | Asp | Trp | Ala | Ser | Gly | Thr | Leu | Tyr | Gln | Asp | Arg | Phe | Asp | Tyr | Leu | 245 | 250 | 255 |     |
| Phe | Tyr | Ile | His | Cys | Arg | Glu | Val | Ser | Leu | Val | Thr | Gln | Arg | Ser | Leu | 260 | 265 | 270 |     |
| Gly | Asp | Leu | Ile | Met | Ser | Cys | Cys | Pro | Asp | Pro | Asn | Pro | Pro | Ile | His | 275 | 280 | 285 |     |
| Lys | Ile | Val | Arg | Lys | Pro | Ser | Arg | Ile | Leu | Phe | Leu | Met | Asp | Gly | Phe | 290 | 295 | 300 |     |
| Asp | Glu | Leu | Gln | Gly | Ala | Phe | Asp | Glu | His | Ile | Gly | Pro | Leu | Cys | Thr | 305 | 310 | 315 | 320 |
| Asp | Trp | Gln | Lys | Ala | Glu | Arg | Gly | Asp | Ile | Leu | Leu | Ser | Ser | Leu | Ile | 325 | 330 | 335 |     |
| Arg | Lys | Lys | Leu | Leu | Pro | Glu | Ala | Ser | Leu | Leu | Ile | Thr | Thr | Arg | Pro | 340 | 345 | 350 |     |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Ala | Leu | Glu | Lys | Leu | Gln | His | Leu | Leu | Asp | His | Pro | Arg | His | Val |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |
| Glu | Ile | Leu | Gly | Phe | Ser | Glu | Ala | Lys | Arg | Lys | Glu | Tyr | Phe | Phe | Lys |
|     |     | 370 |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |
| Tyr | Phe | Ser | Asp | Glu | Ala | Gln | Ala | Arg | Ala | Ala | Phe | Ser | Leu | Ile | Gln |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |
| Glu | Asn | Glu | Val | Leu | Phe | Thr | Met | Cys | Phe | Ile | Pro | Leu | Val | Cys | Trp |
|     |     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |
| Ile | Val | Cys | Thr | Gly | Leu | Lys | Gln | Gln | Met | Glu | Ser | Gly | Lys | Ser | Leu |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |
| Ala | Gln | Thr | Ser | Lys | Thr | Thr | Thr | Ala | Val | Tyr | Val | Phe | Phe | Leu | Ser |
|     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |
| Ser | Leu | Leu | Gln | Pro | Arg | Gly | Gly | Ser | Gln | Glu | His | Gly | Leu | Cys | Ala |
|     | 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |
| His | Leu | Trp | Gly | Leu | Cys | Ser | Leu | Ala | Ala | Asp | Gly | Ile | Trp | Asn | Gln |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |
| Lys | Ile | Leu | Phe | Glu | Ser | Asp | Leu | Arg | Asn | His | Gly | Leu | Gln | Lys |     |
|     |     |     |     | 485 |     |     |     | 490 |     |     |     |     | 495 |     |     |
| Ala | Asp | Val | Ser | Ala | Phe | Leu | Arg | Met | Asn | Leu | Phe | Gln | Lys | Glu | Val |
|     |     | 500 |     |     |     |     |     | 505 |     |     |     |     | 510 |     |     |
| Asp | Cys | Glu | Lys | Phe | Tyr | Ser | Phe | Ile | His | Met | Thr | Phe | Gln | Glu | Phe |
|     | 515 |     |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |
| Phe | Ala | Ala | Met | Tyr | Tyr | Leu | Leu | Glu | Glu | Glu | Lys | Glu | Gly | Arg | Thr |
|     | 530 |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |
| Asn | Val | Pro | Gly | Ser | Arg | Leu | Lys | Leu | Pro | Ser | Arg | Asp | Val | Thr | Val |
| 545 |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |
| Leu | Leu | Glu | Asn | Tyr | Gly | Lys | Phe | Glu | Lys | Gly | Tyr | Leu | Ile | Phe | Val |
|     |     |     |     | 565 |     |     |     | 570 |     |     |     |     |     | 575 |     |
| Val | Arg | Phe | Leu | Phe | Gly | Leu | Val | Asn | Gln | Glu | Arg | Thr | Ser | Tyr | Leu |
|     |     |     | 580 |     |     |     |     | 585 |     |     |     |     | 590 |     |     |
| Glu | Lys | Lys | Leu | Ser | Cys | Lys | Ile | Ser | Gln | Gln | Ile | Arg | Leu | Glu | Leu |
|     |     | 595 |     |     |     |     | 600 |     |     |     |     | 605 |     |     |     |
| Leu | Lys | Trp | Ile | Glu | Val | Lys | Ala | Lys | Ala | Lys | Lys | Leu | Gln | Ile | Gln |
|     | 610 |     |     |     |     | 615 |     |     |     |     | 620 |     |     |     |     |
| Pro | Ser | Gln | Leu | Glu | Leu | Phe | Tyr | Cys | Leu | Tyr | Glu | Met | Gln | Glu | Glu |
| 625 |     |     |     |     | 630 |     |     |     |     | 635 |     |     |     |     | 640 |
| Asp | Phe | Val | Gln | Arg | Ala | Met | Asp | Tyr | Phe | Pro | Lys | Ile | Glu | Ile | Asn |
|     |     |     |     | 645 |     |     |     |     | 650 |     |     |     |     | 655 |     |
| Leu | Ser | Thr | Arg | Met | Asp | His | Met | Val | Ser | Ser | Phe | Cys | Ile | Glu | Asn |
|     |     |     | 660 |     |     |     |     | 665 |     |     |     | 670 |     |     |     |
| Cys | His | Arg | Val | Glu | Ser | Leu | Ser | Leu | Gly | Phe | Leu | His | Asn | Met | Pro |
|     | 675 |     |     |     |     |     | 680 |     |     |     |     | 685 |     |     |     |
| Lys | Glu | Glu | Glu | Glu | Glu | Glu | Lys | Glu | Gly | Arg | His | Leu | Asp | Met | Val |
|     | 690 |     |     |     |     | 695 |     |     |     |     | 700 |     |     |     |     |
| Gln | Cys | Val | Leu | Pro |     |     |     |     |     |     |     |     |     |     |     |

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<211> 317
<212> PRT
<213> Homo sapiens
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<400> 60

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Leu | Thr | Val | Val | Leu | Gln | Gly | Pro | Ala | Gly | Ile | Gly | Lys | Thr | Met | Ala |  |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |  |
| Ala | Lys | Lys | Ile | Leu | Tyr | Asp | Trp | Ala | Ala | Gly | Lys | Leu | Tyr | Gln | Gly |  |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |  |
| Gln | Val | Asp | Phe | Ala | Phe | Phe | Met | Pro | Cys | Gly | Glu | Leu | Leu | Glu | Arg |  |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |  |
| Pro | Gly | Thr | Arg | Ser | Leu | Ala | Asp | Leu | Ile | Leu | Asp | Gln | Cys | Pro | Asp |  |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |  |
| Arg | Gly | Ala | Pro | Val | Pro | Gln | Met | Leu | Ala | Gln | Pro | Gln | Arg | Leu | Leu |  |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     | 80  |  |
| Phe | Ile | Leu | Asp | Gly | Ala | Asp | Glu | Leu | Pro | Ala | Leu | Gly | Gly | Pro | Glu |  |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |  |
| Ala | Ala | Pro | Cys | Thr | Asp | Pro | Phe | Glu | Ala | Ala | Ser | Gly | Ala | Arg | Val |  |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |  |
| Leu | Gly | Gly | Leu | Leu | Ser | Lys | Ala | Leu | Leu | Pro | Thr | Ala | Leu | Leu | Leu |  |
|     | 115 |     |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |  |
| Val | Thr | Thr | Arg | Ala | Ala | Ala | Pro | Gly | Arg | Leu | Gln | Gly | Arg | Leu | Cys |  |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |  |
| Ser | Pro | Gln | Cys | Ala | Glu | Val | Arg | Gly | Phe | Ser | Asp | Lys | Asp | Lys | Lys |  |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |  |
| Lys | Tyr | Phe | Tyr | Lys | Phe | Phe | Arg | Asp | Glu | Arg | Arg | Ala | Glu | Arg | Ala |  |
|     |     |     |     | 165 |     |     |     | 170 |     |     |     |     |     | 175 |     |  |
| Tyr | Arg | Phe | Val | Lys | Glu | Asn | Glu | Thr | Leu | Phe | Ala | Leu | Cys | Phe | Val |  |
|     |     |     | 180 |     |     |     | 185 |     |     |     |     |     | 190 |     |     |  |
| Pro | Phe | Val | Cys | Trp | Ile | Val | Cys | Thr | Val | Leu | Arg | Gln | Gln | Leu | Glu |  |
|     | 195 |     |     |     |     | 200 |     |     |     |     |     | 205 |     |     |     |  |
| Leu | Gly | Arg | Asp | Leu | Ser | Arg | Thr | Ser | Lys | Thr | Thr | Thr | Ser | Val | Tyr |  |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |  |
| Leu | Leu | Phe | Ile | Thr | Ser | Val | Leu | Ser | Ser | Ala | Pro | Val | Ala | Asp | Gly |  |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |  |
| Pro | Arg | Leu | Gln | Gly | Asp | Leu | Arg | Asn | Leu | Cys | Arg | Leu | Ala | Arg | Glu |  |
|     |     |     |     | 245 |     |     |     | 250 |     |     |     |     |     | 255 |     |  |
| Gly | Val | Leu | Gly | Arg | Arg | Ala | Gln | Phe | Ala | Glu | Lys | Glu | Leu | Glu | Gln |  |
|     |     |     | 260 |     |     |     | 265 |     |     |     |     |     | 270 |     |     |  |
| Leu | Glu | Leu | Arg | Gly | Ser | Lys | Val | Gln | Thr | Leu | Phe | Leu | Ser | Lys | Lys |  |
|     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |     |  |
| Glu | Leu | Pro | Gly | Val | Leu | Glu | Thr | Glu | Val | Thr | Tyr | Gln | Phe | Ile | Asp |  |
|     | 290 |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |     |  |
| Gln | Ser | Phe | Gln | Glu | Phe | Leu | Ala | Ala | Leu | Ser | Tyr | Leu |     |     |     |  |
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     |     |  |

<210> 61

<211> 290

<212> PRT

<213> Homo sapiens

<400> 61

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Val | Leu | Ser | Tyr | Cys | Val | Arg | Cys | Cys | Pro | Ala | Gly | Gln | Ala | Leu | Arg |  |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |  |
| Leu | Ile | Ser | Cys | Arg | Leu | Val | Ala | Ala | Gln | Glu | Lys | Lys | Lys | Lys | Ser |  |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Leu | Gly | Lys | Arg | Leu | Gln | Ala | Ser | Leu | Gly | Gly | Gly | Ser | Trp | Leu | Gly |
|     | 35  |     |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Thr | Gln | Leu | Ala | Pro | Glu | Val | Pro | Phe | Arg | Pro | Pro | Cys | Cys | Asp | Ile |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Cys | Pro | Thr | Pro | Pro | Pro | Asp | Pro | Arg | Leu | Leu | Gln | Gly | Lys | Ala | Phe |
| 65  |     |     |     |     | 70  |     |     |     | 75  |     |     |     |     | 80  |     |
| Ala | Arg | Val | Pro | Leu | Asn | Ile | Ala | Pro | Ile | Gln | Pro | Leu | Pro | Arg | Gly |
|     |     |     | 85  |     |     |     |     |     | 90  |     |     |     |     | 95  |     |
| Leu | Ala | Ser | Val | Glu | Arg | Met | Asn | Val | Thr | Val | Leu | Ala | Gly | Ala | Gly |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Pro | Gly | Asp | Pro | Lys | Thr | His | Ala | Met | Thr | Asp | Pro | Leu | Cys | His | Leu |
|     | 115 |     |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Ser | Ser | Leu | Thr | Leu | Ser | His | Cys | Lys | Leu | Pro | Asp | Ala | Val | Cys | Arg |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |
| Asp | Leu | Ser | Glu | Ala | Leu | Arg | Ala | Ala | Pro | Ala | Leu | Thr | Glu | Leu | Gly |
| 145 |     |     |     |     | 150 |     |     |     | 155 |     |     |     |     |     | 160 |
| Leu | Leu | His | Asn | Arg | Leu | Ser | Glu | Ala | Gly | Leu | Arg | Met | Leu | Ser | Glu |
|     |     |     | 165 |     |     |     |     |     | 170 |     |     |     |     | 175 |     |
| Gly | Leu | Ala | Trp | Pro | Gln | Cys | Arg | Val | Gln | Thr | Val | Arg | Val | Gln | Leu |
|     |     | 180 |     |     |     |     |     | 185 |     |     |     |     | 190 |     |     |
| Pro | Asp | Pro | Gln | Arg | Gly | Leu | Gln | Tyr | Leu | Val | Gly | Met | Leu | Arg | Gln |
|     | 195 |     |     |     |     | 200 |     |     |     |     |     | 205 |     |     |     |
| Ser | Pro | Ala | Leu | Thr | Thr | Leu | Asp | Leu | Ser | Gly | Cys | Gln | Leu | Pro | Ala |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |
| Pro | Met | Val | Thr | Tyr | Leu | Cys | Ala | Val | Leu | Gln | His | Gln | Gly | Cys | Gly |
| 225 |     |     |     |     | 230 |     |     |     | 235 |     |     |     |     |     | 240 |
| Leu | Gln | Thr | Leu | Ser | Leu | Ala | Ser | Val | Glu | Leu | Ser | Glu | Gln | Ser | Leu |
|     |     |     | 245 |     |     |     |     |     | 250 |     |     |     |     | 255 |     |
| Gln | Glu | Leu | Gln | Ala | Val | Lys | Arg | Ala | Lys | Pro | Asp | Leu | Val | Ile | Thr |
|     |     | 260 |     |     |     |     |     | 265 |     |     |     |     | 270 |     |     |
| His | Pro | Ala | Leu | Asp | Gly | His | Pro | Gln | Pro | Pro | Lys | Glu | Leu | Ile | Ser |
|     | 275 |     |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |
| Thr | Phe |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|     | 290 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

<210> 62  
 <211> 181  
 <212> PRT  
 <213> Homo sapiens

<400> 62

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ile | Cys | Leu | His | Gly | Val | Gly | Trp | His | Trp | Lys | Asp | Asn | Ser | Arg | Gln |
| 1   |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |     |
| Lys | Lys | Val | Leu | Asp | Trp | Ala | Thr | Gly | Thr | Leu | Tyr | Pro | Gly | Arg | Phe |
|     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |     |
| Asp | Tyr | Val | Phe | Tyr | Val | Ser | Cys | Lys | Glu | Val | Val | Leu | Leu | Leu | Glu |
|     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |     |
| Ser | Lys | Leu | Glu | Gln | Leu | Leu | Phe | Trp | Cys | Cys | Gly | Asp | Asn | Gln | Ala |
|     | 50  |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |     |
| Pro | Val | Thr | Glu | Ile | Leu | Arg | Gln | Pro | Glu | Arg | Leu | Leu | Phe | Ile | Leu |
| 65  |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     | 80  |     |
| Asp | Gly | Phe | Asp | Glu | Leu | Gln | Arg | Pro | Phe | Glu | Glu | Lys | Leu | Lys | Lys |



|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |  |  |
| Arg | Gly | Leu | Ser | Pro | Lys | Glu | Ser | Leu | Leu | His | Leu | Leu | Ile | Arg | Arg |  |  |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |  |  |
| His | Thr | Leu | Pro | Thr | Cys | Ser | Leu | Leu | Ile | Thr | Thr | Arg | Pro | Leu | Ala |  |  |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |  |  |
| Leu | Arg | Asn | Leu | Glu | Pro | Leu | Leu | Lys | Gln | Ala | Arg | His | Val | His | Ile |  |  |
|     |     | 130 |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |  |  |
| Leu | Gly | Phe | Ser | Glu | Glu | Glu | Arg | Ala | Arg | Tyr | Phe | Ser | Ser | Tyr | Phe |  |  |
| 145 |     |     |     |     | 150 |     |     |     | 155 |     |     |     |     |     | 160 |  |  |
| Thr | Asp | Glu | Lys | Gln | Ala | Asp | Arg | Ala | Phe | Asp | Ile | Val | Gln | Lys | Asn |  |  |
|     |     |     | 165 |     |     |     |     | 170 |     |     |     |     |     | 175 |     |  |  |
| Asp | Ile | Leu | Tyr | Lys |     |     |     |     |     |     |     |     |     |     |     |  |  |
|     |     | 180 |     |     |     |     |     |     |     |     |     |     |     |     |     |  |  |

<210> 63  
 <211> 190  
 <212> PRT  
 <213> Homo sapiens

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |  |
| Pro | Arg | Thr | Val | Val | Met | Gln | Gly | Ala | Ala | Gly | Ile | Gly | Lys | Ser | Met |  |  |
| 1   |     |     |     | 5   |     |     |     | 10  |     |     |     |     | 15  |     |     |  |  |
| Leu | Ala | His | Lys | Val | Met | Leu | Asp | Trp | Ala | Asp | Gly | Lys | Leu | Phe | Gln |  |  |
|     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |     |  |  |
| Gly | Arg | Phe | Asp | Tyr | Leu | Phe | Tyr | Ile | Asn | Cys | Arg | Glu | Met | Asn | Gln |  |  |
|     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |     |  |  |
| Ser | Ala | Thr | Glu | Cys | Ser | Met | Gln | Asp | Leu | Ile | Phe | Ser | Cys | Trp | Pro |  |  |
|     | 50  |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |     |  |  |
| Glu | Pro | Ser | Ala | Pro | Leu | Gln | Glu | Leu | Ile | Arg | Val | Pro | Glu | Arg | Leu |  |  |
| 65  |     |     |     | 70  |     |     |     | 75  |     |     |     |     |     |     | 80  |  |  |
| Leu | Phe | Ile | Ile | Asp | Gly | Phe | Asp | Glu | Leu | Lys | Pro | Ser | Phe | His | Asp |  |  |
|     |     |     | 85  |     |     |     |     | 90  |     |     |     |     |     | 95  |     |  |  |
| Pro | Gln | Gly | Pro | Trp | Cys | Leu | Cys | Trp | Glu | Glu | Lys | Arg | Pro | Thr | Glu |  |  |
|     |     | 100 |     |     |     | 105 |     |     |     |     |     | 110 |     |     |     |  |  |
| Leu | Leu | Leu | Asn | Ser | Leu | Ile | Arg | Lys | Lys | Leu | Leu | Pro | Glu | Leu | Ser |  |  |
|     | 115 |     |     |     |     | 120 |     |     |     |     |     | 125 |     |     |     |  |  |
| Leu | Leu | Ile | Thr | Thr | Arg | Pro | Thr | Ala | Leu | Glu | Lys | Leu | His | Arg | Leu |  |  |
|     | 130 |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |     |  |  |
| Leu | Glu | His | Pro | Arg | His | Val | Glu | Ile | Leu | Gly | Phe | Ser | Glu | Ala | Glu |  |  |
| 145 |     |     |     | 150 |     |     |     | 155 |     |     |     |     |     |     | 160 |  |  |
| Arg | Lys | Glu | Tyr | Phe | Tyr | Lys | Tyr | Phe | His | Asn | Ala | Glu | Gln | Ala | Gly |  |  |
|     |     |     | 165 |     |     |     |     | 170 |     |     |     |     |     | 175 |     |  |  |
| Gln | Val | Phe | Asn | Tyr | Val | Arg | Asp | Asn | Glu | Pro | Leu | Phe | Thr |     |     |  |  |
|     |     | 180 |     |     |     |     |     | 185 |     |     |     |     | 190 |     |     |  |  |

<210> 64  
 <211> 603  
 <212> PRT  
 <213> Homo sapiens

<400> 64

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Pro | Asn | Gln | Arg | Gly | Leu | Cys | Ser | Leu | Ala | Ala | Asp | Gly | Leu | Trp | Asn |  |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |  |
| Gln | Lys | Ile | Leu | Phe | Glu | Glu | Gln | Asp | Leu | Arg | Lys | His | Gly | Leu | Asp |  |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |  |
| Gly | Glu | Asp | Val | Ser | Ala | Phe | Leu | Asn | Met | Asn | Ile | Phe | Gln | Lys | Asp |  |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |  |
| Ile | Asn | Cys | Glu | Arg | Tyr | Tyr | Ser | Phe | Ile | His | Leu | Ser | Phe | Gln | Glu |  |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |  |
| Phe | Phe | Ala | Ala | Met | Tyr | Tyr | Ile | Leu | Asp | Glu | Gly | Glu | Gly | Gly | Ala |  |
| 65  |     |     |     |     | 70  |     |     |     | 75  |     |     |     |     |     | 80  |  |
| Gly | Pro | Asp | Gln | Asp | Val | Thr | Arg | Leu | Leu | Thr | Glu | Tyr | Ala | Phe | Ser |  |
|     |     |     | 85  |     |     |     |     | 90  |     |     |     |     |     | 95  |     |  |
| Glu | Arg | Ser | Phe | Leu | Ala | Leu | Thr | Ser | Arg | Phe | Leu | Phe | Gly | Leu | Leu |  |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |  |
| Asn | Glu | Glu | Thr | Arg | Ser | His | Leu | Glu | Lys | Ser | Leu | Cys | Trp | Lys | Val |  |
|     | 115 |     |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |  |
| Ser | Pro | His | Ile | Lys | Met | Asp | Leu | Leu | Gln | Trp | Ile | Gln | Ser | Lys | Ala |  |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |  |
| Gln | Ser | Asp | Gly | Ser | Thr | Leu | Gln | Gln | Gly | Ser | Leu | Glu | Phe | Phe | Ser |  |
| 145 |     |     |     |     | 150 |     |     |     | 155 |     |     |     |     |     | 160 |  |
| Cys | Leu | Tyr | Glu | Ile | Gln | Glu | Glu | Glu | Phe | Ile | Gln | Gln | Ala | Leu | Ser |  |
|     |     |     |     | 165 |     |     |     | 170 |     |     |     |     |     | 175 |     |  |
| His | Phe | Gln | Val | Ile | Val | Val | Ser | Asn | Ile | Ala | Ser | Lys | Met | Glu | His |  |
|     |     | 180 |     |     |     |     |     | 185 |     |     |     |     | 190 |     |     |  |
| Met | Val | Ser | Ser | Phe | Cys | Leu | Lys | Arg | Cys | Arg | Ser | Ala | Gln | Val | Leu |  |
|     | 195 |     |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |  |
| His | Leu | Tyr | Gly | Ala | Thr | Tyr | Ser | Ala | Asp | Gly | Glu | Asp | Arg | Ala | Arg |  |
|     | 210 |     |     |     |     | 215 |     |     |     | 220 |     |     |     |     |     |  |
| Cys | Ser | Ala | Gly | Ala | His | Thr | Leu | Leu | Val | Gln | Leu | Arg | Pro | Glu | Arg |  |
| 225 |     |     |     |     | 230 |     |     |     | 235 |     |     |     |     |     | 240 |  |
| Thr | Val | Leu | Leu | Asp | Ala | Tyr | Ser | Glu | His | Leu | Ala | Ala | Ala | Leu | Cys |  |
|     |     |     |     | 245 |     |     |     | 250 |     |     |     |     |     | 255 |     |  |
| Thr | Asn | Pro | Asn | Leu | Ile | Glu | Leu | Ser | Leu | Tyr | Arg | Asn | Ala | Leu | Gly |  |
|     |     | 260 |     |     |     |     | 265 |     |     |     |     | 270 |     |     |     |  |
| Ser | Arg | Gly | Val | Lys | Leu | Leu | Cys | Gln | Gly | Leu | Arg | His | Pro | Asn | Cys |  |
|     | 275 |     |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |  |
| Lys | Leu | Gln | Asn | Leu | Arg | Leu | Lys | Arg | Cys | Arg | Ile | Ser | Ser | Ser | Ala |  |
|     | 290 |     |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |  |
| Cys | Glu | Asp | Leu | Ser | Ala | Ala | Leu | Ile | Ala | Asn | Lys | Asn | Leu | Thr | Arg |  |
| 305 |     |     |     |     | 310 |     |     |     | 315 |     |     |     |     |     | 320 |  |
| Met | Asp | Leu | Ser | Gly | Asn | Gly | Val | Gly | Phe | Pro | Gly | Met | Met | Leu | Leu |  |
|     |     |     |     | 325 |     |     |     | 330 |     |     |     |     |     | 335 |     |  |
| Cys | Glu | Gly | Leu | Arg | His | Pro | Gln | Cys | Arg | Leu | Gln | Met | Ile | Gln | Leu |  |
|     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |     |  |
| Arg | Lys | Cys | Gln | Leu | Glu | Ser | Gly | Ala | Cys | Gln | Glu | Met | Ala | Ser | Val |  |
|     | 355 |     |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |  |
| Leu | Gly | Thr | Asn | Pro | His | Leu | Val | Glu | Leu | Asp | Leu | Thr | Gly | Asn | Ala |  |
|     | 370 |     |     |     |     | 375 |     |     |     | 380 |     |     |     |     |     |  |
| Leu | Glu | Asp | Leu | Gly | Leu | Arg | Leu | Leu | Cys | Gln | Gly | Leu | Arg | His | Pro |  |
| 385 |     |     |     |     | 390 |     |     |     | 395 |     |     |     |     |     | 400 |  |
| Val | Cys | Arg | Leu | Arg | Thr | Leu | Trp | Leu | Lys | Ile | Cys | Arg | Leu | Thr | Ala |  |
|     |     |     |     | 405 |     |     |     | 410 |     |     |     |     | 415 |     |     |  |
| Ala | Ala | Cys | Asp | Glu | Leu | Ala | Ser | Thr | Leu | Ser | Val | Asn | Gln | Ser | Leu |  |

[illegible]